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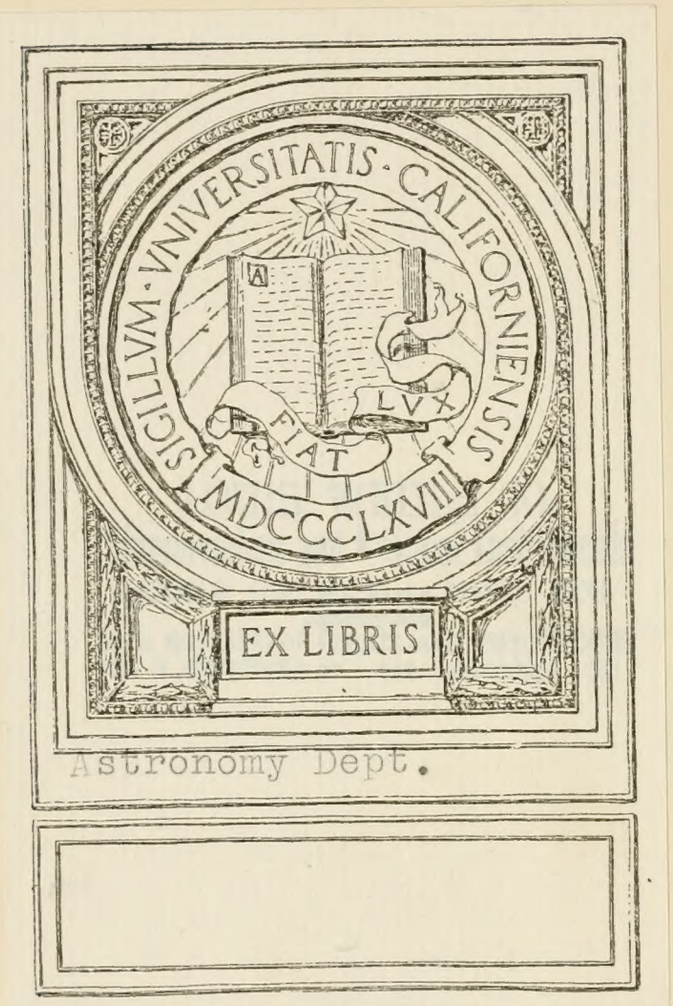
H. O. No. 201

SIMULTANEOUS ALTITUDES AND AZIMUTHS OF CELESTIAL BODIES

PUBLISHED BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE
SECRETARY OF THE NAVY

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919



Astronomy Dept.

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UNIV. OF
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STATUTES OF AUTHORIZATION.

There shall be a Hydrographic Office attached to the Bureau of Navigation in the Navy Department, for the improvement of the means for navigating safely the vessels of the Navy and of the mercantile marine, by providing, under the authority of the Secretary of the Navy, accurate and cheap nautical charts, sailing directions, navigators, and manuals of instructions for the use of all vessels of the United States, and for the benefit and use of navigators generally. (R. S. 431.)

The Secretary of the Navy is authorized to cause to be prepared, at the Hydrographic Office attached to the Bureau of Navigation in the Navy Department, maps, charts, and nautical books relating to and required in navigation, and to publish and furnish them to navigators at the cost of printing and paper, and to purchase the plates and copyrights of such existing maps, charts, navigators, sailing directions, and instructions, as he may consider necessary, and when he may deem it expedient to do so, and under such regulations and instructions as he may prescribe. (R. S. 432.)

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TABLES OF THE SIMULTANEOUS ALTITUDES AND AZIMUTHS OF CELESTIAL BODIES.

FINDING POSITION.

One of the objects of the present publication is to obviate the necessity of computing the altitude and azimuth of the observed celestial body in finding the Sumner line by the method of Saint Hilaire or of the calculated altitude. (Arts. 371 and 372, American Practical Navigator.) To this end there are furnished in these tables the simultaneous values of the altitude and azimuth of celestial bodies whose declinations range to 24° from the equinoctial for all latitudes of the observer extending from degree to degree up to 60° both north and south.

In finding the simultaneous values of the altitude and azimuth for values of the hour-angle, the declination, and the latitude intermediate between those for which the tables are formed, recourse must be had to the procedure of interpolation after the manner long practiced in connection with the use of the Hydrographic Office Azimuth Tables of the Sun; but, in general, it is not necessary to take this course in finding the altitude and azimuth for the purpose of laying down the Sumner line by the Saint Hilaire method, especially when the hour-angle of the observed celestial body is within 2 minutes of being a multiple of 10 minutes. In such a case the position of the observer may be assumed to be in a latitude represented by the integral number of degrees of latitude next to the latitude by dead reckoning and in a longitude which will make the local hour-angle of the observed celestial body an exact multiple of 10 minutes, and the required values of the altitude and the azimuth may then be taken out from these tables without any interpolation, save only for the outstanding number of minutes in the value of the declination.

For purposes of illustration the solution of the example, stated as follows under article 372 of the American Practical Navigator, will be given:

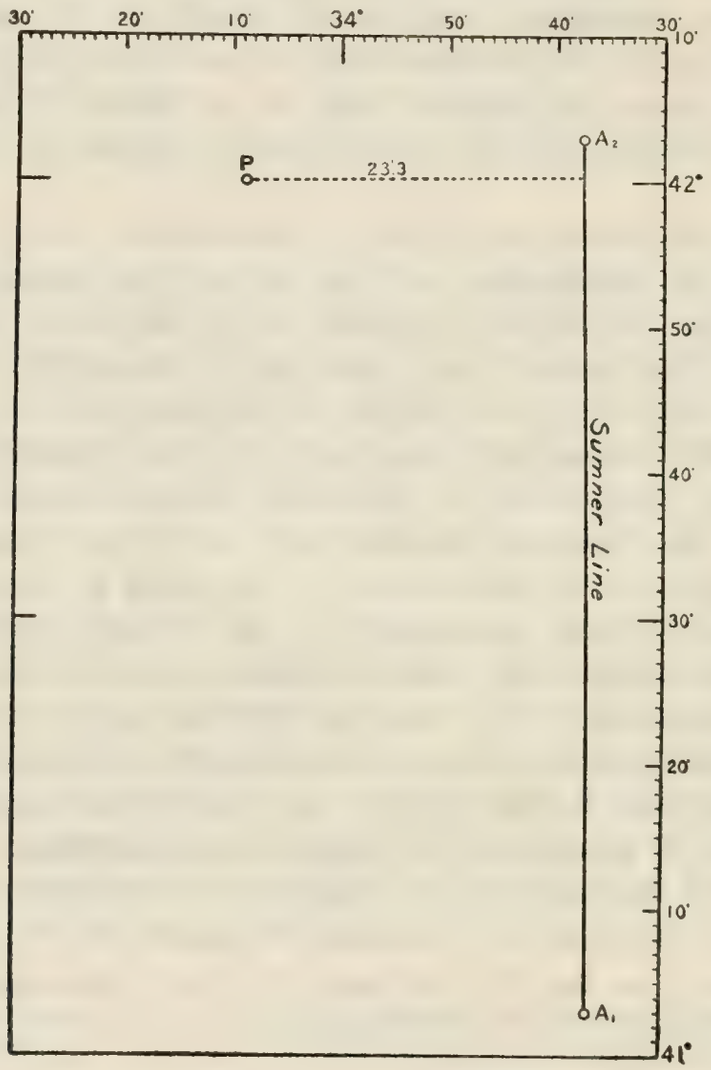
At sea, May 18, 1916, a. m., lat. 41° 33′ N.; long. 33° 37′ W., by dead reckoning, the mean of a series of observed altitudes of the sun's lower limb was 29° 41′ 00″; the mean watch time, $7^h\ 20^m\ 45.3^s$; C. C.+4^m 59.2^s; I. C.−30″; height of eye, 23 feet; C.—W. $2^h\ 17^m\ 06^s$. Required the Sumner line.

Mean W. T.	7	20	45.3
C.—W.	2	17	06
Chro. T.	9	37	51.3
C. C.	+	4	59.2
G. M. T. 17^d	21	42	50.5
Eq. T.	+	3	44.1
G. A. T.	21	46	34.6

Mean Alt. ⊙	29	41	00
Corr.		9	04
h	29	50	04
(Tab. 46)		9′	34″
I. C.		− 0′	30″
Corr.		9′	04″

Dec. $17^d\ 20^h$	19°	30.3′	N
H. D.		0.6′	
G. M. T.		1.7^h	
Corr.		1.02′	
Dec.	19°	31.32′	N
Eq. T. $17^d\ 20^h$	3^m	44.3^s	
H. D.		0.1^s	
G. M. T.		1.7^h	
Corr.		0.17^s	
Eq. T. (Add to mean time.)	3^m	44.1^s	

Under the course of procedure marked out it now becomes the object to assume a geographical position in the nearest longitude to that given by the dead reckoning (33° 37′, or $2^h\ 14^m\ 28^s$), which, when applied to the Greenwich hour-angle or Greenwich apparent time, will make the local hour-angle or local apparent time a multiple of 10 minutes, and in a latitude represented by the nearer whole degree of latitude to the latitude given by the dead reckoning. Accordingly, the longitude of the assumed position would be 34° 08′ 39″ W., or $2^h\ 16^m\ 34.6^s$ W., which applied to the Greenwich apparent time gives the



local apparent time $19^h\ 30^m$ or hour-angle from the meridian of the assumed position ($24^h - 19^h\ 30^m$) $4^h\ 30^m$ easterly.

From the tables of Simultaneous Altitudes and Azimuths, for latitude 42° N. and hour-angle $4^h\ 30^m$, we obtain:

Corresponding to dec. 19° of the same name as the latitude, altitude 29° 07.6′ and azimuth 90.0°.
Corresponding to dec. 20° of the same name as the latitude, altitude 29° 44.5′ and azimuth 89.1°.
Therefore, corresponding to dec. 19° 31.32′ or 19° .52, altitude 29° 26.8′ and azimuth 89.5°.

A comparison of the altitude just found from the tables with the corrected measured altitude deduced above as 29° 50′ 04″ shows the altitude-difference to be 23.3′, which, being laid off as an intercept from the assumed geographical

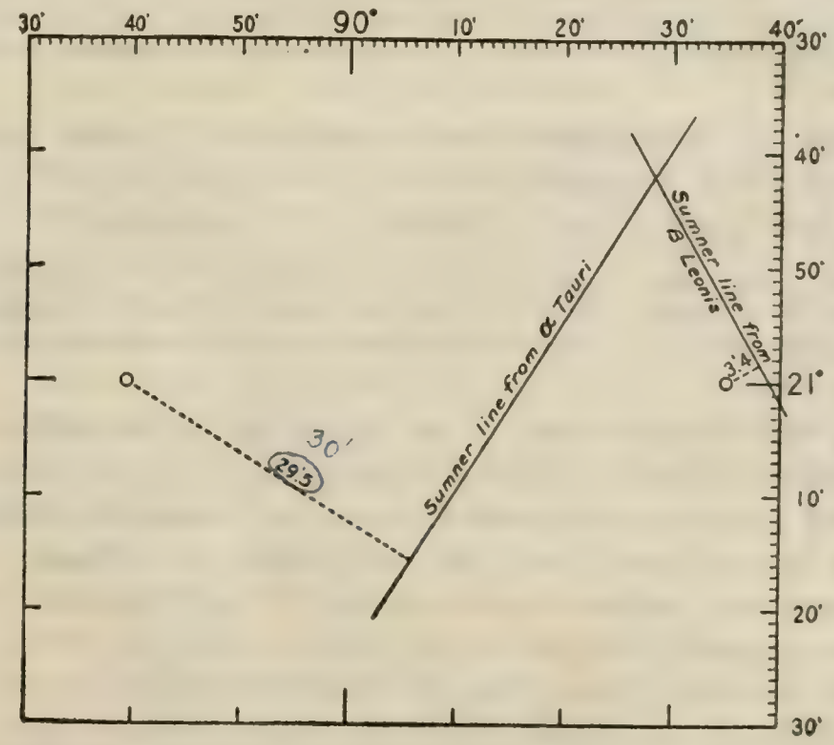
position along the bearing, 89.5°, of the observed celestial body, gives the point through which the Sumner line or line of position of the observer is to be drawn at right angles to the bearing. Since the corrected measured altitude is higher than the calculated or tabulated altitude, the intercept is, in this case, laid off toward the observed body, and gives the Sumner line shown in the accompanying diagram, which agrees with that found by drawing a straight line through the geographical positions deduced in the solution of this problem in article 370 of the American Practical Navigator.

And in further illustration the solution is given of example 217 in Muir's "Navigation and Compass Deviations," as follows:

April 5, 1918, p. m., lat. by D. R. 20° 38′ S., long. by D. R. 90° 10′ E., or $6^h\ 00^m\ 40^s$ E., observed simultaneous altitudes of stars α Tauri (Aldebaran) bearing northward and westward, and β Leonis (Denebola) bearing northward and eastward. Sextant altitude of α Tauri 26° 00′ 40″, of β Leonis 25° 17′ 00″. I. C. −1′ 00″. Height of eye, 19 feet. W. T. of obs. $7^h\ 16^m\ 44^s$. C.−W. $5^h\ 55^m\ 24^s$. Chro. fast of G. M. T. $1^m\ 38^s$. Required the ship's position.

Times:

W. T.	7	16	44				
C.—W.	5	55	24				
Chro. T.	1	12	08				
C. C.		−1	38				
G. M. T.	1	10	30				
R. A. M. ⊙	0	51	54.6				
Corr. for G. M. T.			11.6				
G. S. T.	2	02	36.2	G. S. T.	2	02	36.2
R. A. Aldebaran	4	31	14.0	R. A. Denebola	11	44	55.8
G. H. A.	2	28	37.8 E.	G. H. A.	9	42	19.6 E.
Assumed long. instead of D.R. long. to obviate interpolation for H. A.	5	58	37.8 E.	Assumed long. instead of D.R. long. to obviate interpolation for H. A.	6	02	19.6 E.
H. A. at assumed meridian	3	30	W.	H. A. at assumed meridian	3	40	E.



Data for α Tauri. (Aldebaran)

Altitude.		R. A. and dec.
	° ′ ″	
Alt. by sextant	26 00 40	R. A. $4^h\ 31^m\ 14.0^s$.
Correction	− 7 15	
h	25 53 25	d 16° 20.7′ N.
Table 46	− 6 15	
I. C.	− 1 00	
Correction	− 7 15	

Data for β Leonis. (Denebola)

Altitude.		R. A. and dec.
	° ′ ″	
Alt. by sextant	25 17 00	R. A. $11^h\ 44^m\ 55.8^s$
Correction	− 7 19	d 15° 01.5′ N.
h	25 09 41	
Table 46	− 6 19	
I. C.	− 1 00	
Correction	− 7 19	

From the Tables of Simultaneous Altitudes and Azimuths for latitude 21° S. and hour-angle $3^h\ 30^m$ we obtain as the altitude and azimuth of α Tauri at the assumed position, latitude 21° S., longitude $5^h\ 58^m\ 37.8^s$, or 89° 39′ 27″ E., thus:

Corresponding to dec. 16° of contrary name to the latitude, altitude 26° 35.1′ and azimuth 121.5°.
Corresponding to dec. 17° of contrary name to the latitude, altitude 26° 01. 3′ and azimuth 122.4°.
Therefore, corresponding to dec. 16° 20.7′ or 16°.345 of contrary name to the latitude, altitude 26° 23. 4′ and azimuth S. 121.8° W.

And likewise for the altitude and azimuth of β Leonis at the assumed position, latitude 21° S., longitude $6^h\ 02^m\ 19.6^s$, or 90° 34′ 54″ E., by entering the tables with hour-angle $3^h\ 40^m$ in latitude 21° S. we obtain:

Corresponding to dec. 15° of contrary name to the latitude, altitude 25° 07.1′ and azimuth 119.1°.
Corresponding to dec. 16° of contrary name to the latitude, altitude 24° 34.8′ and azimuth 120.0°.
Therefore, corresponding to dec. 15° 01.5′ or 15°.025 of contrary name to the latitude, altitude 25° 06.3′ and azimuth S. 119.1° E.

Comparing the altitudes just found from the tables with the respective corrected measured altitudes deduced above as 25° 53′ 25″ for α Tauri and 25° 09′ 41″ for β Leonis, the altitude-difference or intercept of shortest distance to the Sumner line deduced from the observation of α Tauri is found to be 30′ from the assumed position in latitude 21° S. and longitude 89° 39′ 27″ E. in the direction opposite to the bearing of the observed body, since the corrected measured altitude is less than the calculated altitude; and the altitude-difference or intercept of shortest distance to the Sumner line deduced from the observation of β Leonis is found to be 3.4′ from the assumed position in

latitude 21° S. and longitude 90° 34′ 54″ E. in the direction of the bearing of the observed body 60.9°, or S. 119.1° E., since the corrected measured altitude is in this case higher than the calculated altitude. These two Sumner lines are plotted in the second accompanying diagram, and their intersection shows the ship's position at the time of observation to have been in latitude 20° 42′ S. and longitude 90° 28½′ E.

There is another method whose convenience of application in finding the Sumner line from these tables entitles it to mention. In determining a Sumner line from the altitude of a celestial body by the tangent method (Art. 369, American Practical Navigator), it is customary to assume a latitude and compute the corresponding hour-angle by the time-sight formula, and thence, converting the hour-angle into local apparent time in the case of the sun or into local sidereal time in the case of other celestial bodies, to find the longitude corresponding to the assumed latitude by comparison with the Greenwich apparent time or Greenwich sidereal time, as the case may be. A straight line drawn through the point defined by the latitude and longitude, at right angles to the bearing indicated by the azimuth of the observed body at the time of observation, will be the resulting Sumner line.

In the present tables simultaneous values of the hour-angle and the azimuth are given for stated values of the altitude, declination, and latitude; and thus, for values of the altitude given in the tables, the materials are supplied for directly drawing the Sumner line through a point defined by its longitude on the parallel of latitude represented by the integral number of degrees of latitude next to the latitude by dead reckoning, and, moreover, when the value of the altitude is intermediate between those given by the tables the actual line of position may be obtained by shifting this Sumner line a distance in nautical miles equal to the difference in minutes of arc between the altitude given by the tables and the true altitude from observation. The shifted line may be considered to remain parallel to the initial direction in all cases in which the bearing of the observed celestial body exceeds 45° from the meridian when the altitude is less than 45°, as may be seen from the accompanying table, in which the change of bearing for each nautical mile of shift is entered for given values of the altitude and azimuth from 0° to 90°, thus showing when the tabulated value is multiplied by the number of nautical miles of shift the amount of change to which the direction of the Sumner line would be subjected in any case. To illustrate the procedure, the solution of the sight of α Tauri (Aldebaran) in the last example is given:

From the data there stated the observation showed the true altitude of α Tauri (R. A. $4^h\ 31^m\ 14^s$; dec. 16° 20′.7 N.) to be 25° 53′ 25″ at G. S. T. April 5, $2^h\ 02^m\ 36.2^s$. From the Tables of Simultaneous Altitudes and Azimuths for latitude 21° S., which is the whole degree of latitude next to the D. R. latitude, we obtain for altitude 26° 22′.9, which is the value corresponding to declination 16° 20′.7 closest to the true altitude from observation, the hour-angle $3^h\ 30^m$ and azimuth S. 121°.8 W. or N. 58°.2 W. or 301°.8.

	h	m	s	
R. A. α Tauri	4	31	14	
H. A. α Tauri	3	30		W.
L. S. T.	8	01	14	
G. S. T	2	02	36.2	
Long.	5	58	37.8	E.=89° 39′ 27° E.

A Sumner line drawn through the geographical position in latitude 21° S. and longitude 89° 39′ 27″ E. in a direction 211°.8—that is, at right angles to the direction 301°.8—would therefore be the true line of position if 26° 22′.9 were the true altitude; but, as the true altitude is 29′.5 less than this, the true line

26° 23.4 30′ 26° 23.4

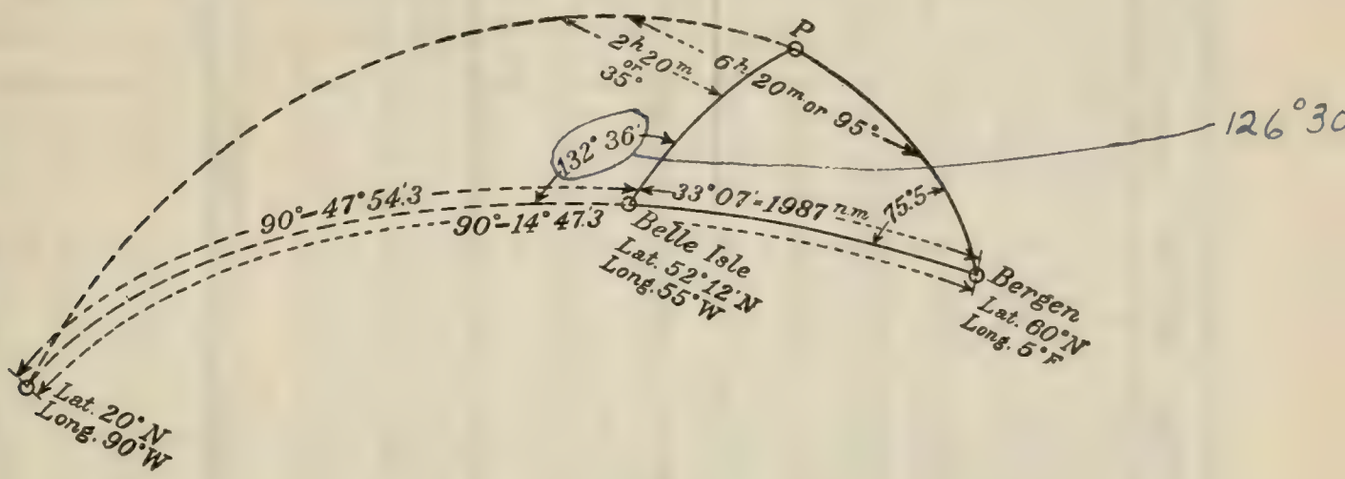
will be 29'.5 farther away in a direction opposite to the bearing of the observed celestial body. The Table of Change of Azimuth per Minute of Arc of Altitude shows that for an altitude of 26° and an azimuth 58° from the meridian an increase of 1′ of altitude will cause a decrease of 0′.3 of azimuth; hence a decrease of 1′ of altude will cause an increase of 0′.3 of azimuth and a decrease of 29′.5 of altitude will cause an increase of 9′ in azimuth. So that, strictly speaking, the shifted line will be at right angles to a direction 9′ more from the meridian than is the Sumner line originally drawn. By applying these results to the preceding figure it will be manifest that the position line deduced from this procedure is identical with that already laid down by the previous method.

FINDING THE COURSE AND DISTANCE IN GREAT CIRCLE SAILING.

Having long recognized the convenience of obtaining the course in great-circle sailing from the Hydrographic Office Time-Azimuth Tables, navigators will welcome the further convenience afforded by the Tables of Simultaneous Altitudes and Azimuths of obtaining the great-circle distance as well as the course. It will be found by comparison that if the latitude of the point of departure in great-circle sailing be substituted for the latitude of the observer in the time-azimuth problem (art. 352, American Practical Navigator), the latitude of the destination for the declination of the celestial body, and the longitude interval for the hour-angle, the solution of the initial course will be the same as that of the azimuth, and the solution of the great-circle distance in nautical miles from the point of departure to the point of destination will be the same as the zenith distance, which is the complement of the altitude, or the remainder obtained by subtracting the altitude from 90°, reduced to minutes of arc.

When the point of destination is in a latitude within 24° of the Equator, advantage may thus be directly taken to find the course to the nearest one-tenth of a degree, and also, by converting into minutes of arc the remainder found by subtracting from 90° the altitude taken from the tables, the distance to the nearest one-tenth of a nautical mile; and, lest it be inferred that since the extent of the tables in declination is limited to 24°, this method would only be applicable where the latitude of the place of destination is within 24° of the Equator, it will be valuable to point out to navigators that the present tables are universally applicable for finding great-circle courses and distances because all other great circles than the Equator cross the Equator; and, if the problem of finding the courses and distances is with reference to a great-circle track between a point of departure and a point of destination, both lying beyond 24° of latitude from the Equator, it is only necessary to find a point lying on the prolongation of the great circle arc beyond the point of actual destination and within 24° of latitude from the Equator, and to treat this point as if it were the point of destination. To illustrate, take the problem of finding the initial and final courses and the distance on a voyage between Bergen, in latitude 60° N. and longitude 5° E., and the Strait of Belle Isle, in latitude 52° 12′ N. and longitude 55° W. On a copy of a gnomonic chart, like Godfray's great-circle sailing chart, draw a straight line between the geographical positions above stated and extend it beyond the latter into the Tropics. It will be found to intersect the twentieth degree parallel of latitude in longitude 90° W., or 95° from the meridian of the point of departure. In the Tables of Simultaneous Altitudes and Azimuths at latitude 60°, under declination 20° and opposite hour-angle $6^h\ 20^m$ or 95°, are found altitude 14° 47.3′

and azimuth 75.5°; and at latitude 52° 12′, under declination 20° and opposite hour-angle $2^h\ 20^m$ or 35°, are found altitude 47° 54.3′ and azimuth 132° 36′. The initial course is therefore N. 75.5° W., the final course N. 132° 36′ W., and the distance (47° 54.3′—14° 47.3′ = 33° 07′) 1,987 nautical miles.



IDENTIFICATION OF STARS.

In the absence of Hydrographic Office Publication No. 127, The Star Identification Tables, the present tables will subserve a further useful purpose in enabling navigators to find the names of the stars upon which they may have occasion to take observations for the purpose of finding geographical position and direction at sea. The stars that are bright enough to be observed with nautical instruments are so far apart in the firmament that the identification will be complete without resorting to interpolation in the use of the tables as presented. For this purpose it will suffice to note, on the page marked with the latitude of the observer, the values of the declination and the hour-angle corresponding to the pair of simultaneous values of the altitude and azimuth found to be in closest agreement with the altitude measured for use in the solution of the geographical position taken together with the azimuth of the observed star as given by its compass bearing corrected for variation of the compass and deviation of the compass. In the catalogues and lists giving the names and magnitudes of the stars, they are tabulated by their declination and right ascension because these coordinates are independent of diurnal rotation, and, this being so, it becomes necessary, on taking out from the tables the declination and hour-angle corresponding to the observed altitude and aximuth of the celestial body to be identified, to convert the hour-angle into right ascension; and then with the declination and right ascension thus found, to scan the list of stars and find the name of that one whose catalogued coordinates best agree with these values.

To find the right ascension, it is only necessary, after having found the local sidereal time of observation by adding to the local mean time the right ascension of the mean sun, corrected for Greenwich mean time, to subtract the approximate hour-angle, taken from the table, from the local sidereal time of observation if the observed body is west of the meridian of the observer, or to add the hour-angle to the local sidereal time if the observed body is east of the meridian of the observer.

$$\frac{\Delta Z}{\Delta h} = -\tan h' \cot Z' \text{ (\textit{always} minus with } Z' \text{ less than } 90°).$$

h' \ Z'	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°	80°	90°	Z'
		′	′	′	′	′	′	′	′	′	′	′	′	′	′	
0°	*ind.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90°
2	∞	.40	.20	.13	.10	.07	.06	.05	.04	.03	.03	.02	.01	.01	.00	88
4	∞	.80	.40	.26	.19	.15	.12	.10	.08	.07	.06	.04	.03	.01	.00	86
6	∞	1.20	.60	.39	.29	.23	.18	.15	.13	.11	.09	.06	.04	.02	.00	84
8	∞	1.61	.80	.52	.39	.30	.24	.20	.17	.14	.12	.08	.05	.02	.00	82
10	∞	2.02	1.00	0.66	0.48	0.38	0.31	0.25	0.21	0.18	0.15	0.10	0.06	0.03	0.00	80
12	∞	2.43	1.21	.79	.58	.46	.37	.30	.25	.21	.18	.12	.08	.04	.00	78
14	∞	2.85	1.41	.93	.69	.53	.43	.36	.30	.25	.21	.14	.09	.04	.00	76
16	∞	3.28	1.63	1.07	.79	.61	.50	.41	.34	.29	.24	.17	.10	.05	.00	74
18	∞	3.71	1.84	1.21	.89	.70	.56	.46	.39	.32	.27	.19	.12	.06	.00	72
20	∞	4.16	2.06	1.36	1.00	0.78	0.63	0.52	0.43	0.36	0.31	0.21	0.13	0.06	0.00	70
22	∞	4.62	2.29	1.51	1.11	.87	.70	.58	.48	.40	.34	.23	.15	.07	.00	68
24	∞	5.09	2.53	1.66	1.22	.95	.77	.64	.53	.45	.37	.26	.16	.08	.00	66
26	∞	5.57	2.77	1.82	1.34	1.05	.84	.70	.58	.49	.41	.28	.18	.09	.00	64
28	∞	6.08	3.02	1.98	1.46	1.14	.92	.76	.63	.53	.45	.31	.19	.09	.00	62
30	∞	6.60	3.27	2.15	1.59	1.24	1.00	0.82	0.69	0.58	0.48	0.33	0.21	0.10	0.00	60
32	∞	7.14	3.54	2.33	1.72	1.34	1.08	.89	.74	.62	.52	.36	.23	.11	.00	58
34	∞	7.71	3.83	2.52	1.85	1.45	1.17	.96	.80	.67	.57	.39	.25	.12	.00	56
36	∞	8.30	4.12	2.71	2.00	1.56	1.26	1.04	.87	.73	.61	.42	.26	.13	.00	54
38	∞	8.93	4.43	2.92	2.15	1.68	1.35	1.12	.93	.78	.66	.45	.28	.14	.00	52
40	∞	9.59	4.76	3.13	2.31	1.80	1.45	1.20	1.00	0.84	0.70	0.48	0.31	0.15	0.00	50
42	∞	10.29	5.11	3.36	2.47	1.93	1.56	1.29	1.07	.90	.76	.52	.33	.16	.00	48
44	∞	11.04	5.48	3.60	2.65	2.07	1.67	1.38	1.15	.97	.81	.56	.35	.17	.00	46
46	∞	11.84	5.87	3.86	2.85	2.22	1.79	1.48	1.23	1.04	.87	.60	.38	.18	.00	44
48	∞	12.69	6.30	4.14	3.05	2.38	1.92	1.59	1.32	1.11	.93	.64	.40	.20	.00	42
50	∞	13.62	6.76	4.45	3.27	2.56	2.06	1.70	1.42	1.19	1.00	0.69	0.43	0.21	0.00	40
52	∞	14.63	7.26	4.78	3.52	2.74	2.22	1.83	1.53	1.28	1.07	.74	.47	.23	.00	38
54	∞	15.73	7.81	5.14	3.78	2.95	2.38	1.97	1.64	1.38	1.15	.80	.50	.24	.00	36
56	∞	16.95	8.41	5.53	4.07	3.18	2.57	2.12	1.77	1.48	1.24	.86	.54	.26	.00	34
58	∞	18.29	9.08	5.97	4.40	3.43	2.77	2.29	1.91	1.60	1.34	.92	.58	.28	.00	32
60	∞	19.80	9.82	6.46	4.76	3.71	3.00	2.47	2.06	1.73	1.45	1.00	0.63	0.31	0.00	30
62	∞	21.50	10.67	7.02	5.17	4.03	3.26	2.69	2.24	1.88	1.58	1.09	.68	.33	.00	28
64	∞	23.44	11.63	7.65	5.63	4.40	3.55	2.93	2.44	2.05	1.72	1.19	.75	.36	.00	26
66	∞	25.67	12.74	8.38	6.17	4.82	3.89	3.21	2.68	2.25	1.88	1.30	.82	.40	.00	24
68	∞	28.29	14.04	9.24	6.80	5.31	4.29	3.53	2.95	2.48	2.08	1.43	.90	.44	.00	22
70	∞	31.40	15.58	10.25	7.55	5.89	4.76	3.92	3.27	2.75	2.31	1.59	1.00	0.48	0.00	20
72	∞	35.18	17.45	11.49	8.46	6.60	5.33	4.40	3.67	3.08	2.58	1.78	1.12	.54	.00	18
74	∞	39.86	19.78	13.01	9.58	7.48	6.04	4.98	4.16	3.49	2.93	2.01	1.27	.61	.00	16
76	∞	45.84	22.75	14.97	11.02	8.60	6.95	5.73	4.78	4.01	3.37	2.32	1.46	.71	.00	14
78	∞	53.77	26.68	17.56	12.93	10.09	8.15	6.72	5.61	4.70	3.95	2.72	1.71	.83	.00	12
80	∞	64.82	32.16	21.17	15.58	12.16	9.82	8.10	6.76	5.67	4.76	3.27	2.06	1.00	0.00	10
82	∞	86.68	40.35	26.56	19.55	15.26	12.32	10.16	8.48	7.12	5.97	4.11	2.59	1.25	.00	8
84	∞	.....	53.96	35.51	26.14	20.40	16.48	13.59	11.34	9.51	7.98	5.49	3.46	1.68	.00	6
86	∞	.....	81.10	53.37	39.29	30.67	24.77	20.42	17.04	14.30	12.00	8.26	5.21	2.52	.00	4
88	∞	.....	.....	.....	78.68	61.41	49.60	40.90	34.13	28.64	24.03	16.53	10.42	5.05	.00	2
90	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	*ind.*	0
h'	90°	85°	80°	75°	70°	65°	60°	55°	50°	45°	40°	30°	20°	10°	0°	Z' \ h'

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 00.0	89.0	0 00.0	88.0	0 00.0	87.0	0 00.0	86.0	6 00
5 50	2 30.0	90.0	2 29.9	89.0	2 29.9	88.0	2 29.8	87.0	2 29.6	86.0	5 50
40	5 00.0	90.0	5 00.0	89.0	4 59.8	88.0	4 59.6	87.0	4 59.3	86.0	40
30	7 30.0	90.0	7 29.9	89.0	7 29.7	88.0	7 29.1	87.0	7 28.9	86.0	30
20	10 00.0	90.0	9 59.9	89.0	9 59.6	88.0	9 59.2	87.0	9 58.5	85.9	20
10	12 30.0	90.0	12 29.9	89.0	12 29.6	88.0	12 28.9	86.9	12 28.2	85.9	10
5 00	15 00.0	90.0	14 59.9	89.0	14 59.4	87.9	14 58.7	86.9	14 57.8	85.9	5 00
4 50	17 30.0	90.0	17 29.8	89.0	17 29.3	87.9	17 28.6	86.9	17 27.3	85.9	4 50
40	20 00.0	90.0	19 59.8	88.9	19 59.2	87.9	19 58.3	86.8	19 56.9	85.8	40
30	22 30.0	90.0	22 29.8	88.9	22 29.1	87.9	22 28.0	86.8	22 26.5	85.7	30
20	25 00.0	90.0	24 59.8	88.9	24 59.0	87.8	24 57.8	86.7	24 56.1	85.6	20
10	27 30.0	90.0	27 29.8	88.9	27 28.9	87.8	27 27.5	86.6	27 25.6	85.5	10
4 00	30 00.0	90.0	29 59.7	88.8	29 58.8	87.7	29 57.3	86.5	29 55.1	85.4	4 00
3 50	32 30.0	90.0	32 29.6	88.8	32 28.6	87.7	32 27.0	86.4	32 24.7	85.3	3 50
40	35 00.0	90.0	34 59.6	88.8	34 58.5	87.6	34 56.7	86.4	34 54.1	85.1	40
30	37 30.0	90.0	37 29.6	88.7	37 28.4	87.5	37 26.4	86.2	37 23.6	85.0	30
20	40 00.0	90.0	39 59.6	88.7	39 58.2	87.4	39 56.0	86.1	39 53.0	84.8	20
10	42 30.0	90.0	42 29.5	88.6	42 28.2	87.3	42 25.7	85.9	42 22.4	84.6	10
3 00	45 00.0	90.0	44 59.5	88.6	44 57.9	87.2	44 55.3	85.8	44 51.6	84.4	3 00
2 50	47 30.0	90.0	47 29.2	88.5	47 27.7	87.1	47 24.8	85.6	47 20.9	84.1	2 50
40	50 00.0	90.0	49 59.4	88.5	49 57.5	86.9	49 54.4	85.4	49 50.0	83.8	40
30	52 30.0	90.0	52 29.4	88.4	52 27.4	86.7	52 23.9	85.1	52 19.1	83.4	30
20	55 00.0	90.0	54 59.2	88.3	54 57.0	86.5	54 53.3	84.8	54 48.1	83.0	20
10	57 30.0	90.0	57 29.1	88.1	57 26.8	86.3	57 22.5	84.4	57 16.8	82.5	10
2 00	60 00.0	90.0	59 59.1	88.0	59 56.3	86.0	59 51.9	84.0	59 45.6	82.0	2 00
1 50	62 30.0	90.0	62 29.0	87.8	62 26.0	85.7	62 20.6	83.5	62 13.9	81.4	1 50
40	65 00.0	90.0	64 58.9	87.6	64 55.5	85.3	64 50.0	82.9	64 42.1	80.6	40
30	67 30.0	90.0	67 28.5	87.4	67 25.2	84.8	67 18.8	82.2	67 09.9	79.7	30
20	70 00.0	90.0	69 58.6	87.1	69 54.2	84.2	69 47.1	81.3	69 37.2	78.5	20
10	72 30.0	90.0	72 28.2	86.7	72 23.5	83.4	72 15.0	80.1	72 03.5	76.9	10
1 00	75 00.0	90.0	74 58.1	86.1	74 52.2	82.3	74 42.6	78.6	74 29.3	74.9	1 00
0 50	77 30.0	90.0	77 27.5	85.4	77 21.0	80.8	77 08.8	76.4	76 53.2	72.1	0 50
40	80 00.0	90.0	79 57.0	84.3	79 48.2	78.6	79 33.8	73.2	79 14.2	68.1	40
30	82 30.0	90.0	82 25.5	82.6	82 14.5	75.0	81 55.5	68.1	81 30.0	61.8	30
20	85 00.0	90.0	84 54.1	78.7	84 36.8	68.2	84 10.2	59.0	83 36.0	51.2	20
10	87 30.0	90.0	87 18.4	68.2	86 47.9	51.3	86 05.7	39.8	85 17.0	32.0	10
0 00	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	85.0	0 00.0	84.0	0 00.0	83.0	0 00.0	82.0	0 00.0	81.0	6 00
5 50	2 29.5	85.0	2 29.2	84.0	2 28.9	83.0	2 28.6	82.0	2 28.1	81.0	5 50
40	4 58.9	85.0	4 58.4	84.0	4 57.8	83.0	4 57.0	82.0	4 56.3	81.0	40
30	7 28.3	84.9	7 27.5	84.0	7 26.6	82.9	7 25.5	81.9	7 24.4	80.9	30
20	9 57.7	84.9	9 56.7	83.9	9 55.5	82.9	9 54.1	81.9	9 52.5	80.9	20
10	12 27.2	84.9	12 25.8	83.9	12 24.4	82.8	12 22.6	81.8	12 20.6	80.8	10
5 00	14 56.5	84.8	14 54.9	83.8	14 53.1	82.8	14 51.0	81.7	14 48.6	80.7	5 00
4 50	17 25.9	84.7	17 24.1	83.7	17 21.9	82.7	17 19.4	81.6	17 16.5	80.6	4 50
40	19 55.2	84.6	19 53.1	83.6	19 50.7	82.6	19 47.9	81.5	19 44.6	80.4	40
30	22 24.6	84.6	22 22.2	83.5	22 19.4	82.4	22 16.2	81.4	22 12.5	80.3	30
20	24 53.9	84.5	24 51.2	83.4	24 48.0	82.3	24 44.4	81.2	24 40.3	80.1	20
10	27 23.2	84.4	27 20.2	83.3	27 16.5	82.1	27 12.5	81.0	27 08.0	79.9	10
4 00	29 52.4	84.2	29 49.1	83.1	29 45.2	81.9	29 40.7	80.8	29 35.6	79.6	4 00
3 50	32 21.8	84.1	32 18.0	82.9	32 13.7	81.7	32 08.7	80.6	32 03.1	79.4	3 50
40	34 50.9	83.9	34 46.9	82.7	34 42.1	81.5	34 36.6	80.3	34 30.4	79.1	40
30	37 20.0	83.7	37 15.7	82.5	37 10.5	81.2	37 04.3	80.0	36 57.7	78.7	30
20	39 49.0	83.5	39 44.2	82.2	39 38.6	80.9	39 32.0	79.6	39 24.6	78.3	20
10	42 18.0	83.3	42 12.6	81.9	42 06.5	80.6	41 59.4	79.2	41 51.5	77.9	10
3 00	44 47.0	83.0	44 41.2	81.6	44 34.5	80.2	44 26.7	78.8	44 17.9	77.4	3 00
2 50	47 15.8	82.6	47 09.5	81.2	47 02.1	79.7	46 53.6	78.3	46 44.1	76.8	2 50
40	49 44.5	82.2	49 37.6	80.7	49 29.6	79.2	49 20.4	77.7	49 10.0	76.2	40
30	52 13.0	81.7	52 05.5	80.2	51 56.8	78.6	51 46.7	77.0	51 35.3	75.4	30
20	54 41.4	81.2	54 33.2	79.6	54 23.7	77.9	54 12.6	76.2	54 00.3	74.6	20
10	57 09.6	80.7	57 00.6	78.9	56 50.1	77.1	56 38.1	75.3	56 24.5	73.6	10
2 00	59 37.5	80.1	59 27.6	78.1	59 16.1	76.2	59 02.9	74.3	58 48.0	72.4	2 00
1 50	62 05.1	79.3	61 54.1	77.2	61 41.4	75.1	61 26.9	73.1	61 10.4	71.1	1 50
40	64 32.2	78.3	64 20.1	76.0	64 06.0	73.8	63 49.8	71.6	63 31.7	69.5	40
30	66 58.8	77.1	66 45.2	74.6	66 29.3	72.2	66 11.4	69.8	65 51.2	67.5	30
20	69 24.5	75.7	69 09.3	72.9	68 51.5	70.3	68 31.2	67.7	68 08.6	65.2	20
10	71 49.5	73.8	71 32.0	70.7	71 11.5	67.8	70 48.6	65.0	70 23.0	62.2	10
1 00	74 12.5	71.3	73 52.2	67.9	73 28.9	64.6	73 02.6	61.5	72 33.6	58.5	1 00
0 50	76 33.5	68.0	76 09.2	64.1	75 42.0	60.4	75 11.5	57.0	74 38.2	53.8	0 50
40	78 49.8	63.3	78 21.2	58.8	77 48.8	54.8	77 13.1	51.0	76 34.6	47.6	40
30	81 00.0	56.2	80 24.0	51.2	79 45.0	46.8	79 02.7	42.9	78 18.4	39.5	30
20	82 56.0	44.9	82 11.6	39.7	81 24.3	35.4	80 34.5	31.8	79 42.9	28.8	20
10	84 24.7	26.5	83 30.1	22.6	82 34.2	19.6	81 37.3	17.2	80 39.7	15.4	10
0 00	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	80.0	0 00.0	79.0	0 00.0	78.0	0 00.0	77.0	0 00.0	76.0	6 00
5 50	2 27.7	80.0	2 27.3	79.0	2 26.8	78.0	2 26.3	77.0	2 25.6	76.0	5 50
40	4 55.5	80.0	4 54.5	79.0	4 53.4	78.0	4 52.3	77.0	4 51.1	76.0	40
30	7 23.1	79.9	7 21.6	78.9	7 20.1	77.9	7 18.4	76.9	7 16.6	75.9	30
20	9 50.8	79.9	9 48.9	78.8	9 46.8	77.8	9 44.5	76.8	9 42.0	75.8	20
10	12 18.4	79.8	12 15.9	78.7	12 13.3	77.7	12 10.6	76.7	12 07.5	75.7	10
5 00	14 46.0	79.7	14 43.1	78.6	14 39.9	77.6	14 36.4	76.6	14 32.6	75.5	5 00
4 50	17 13.6	79.6	17 10.0	78.5	17 06.4	77.5	17 02.2	76.4	16 57.9	75.3	4 50
40	19 41.0	79.4	19 37.1	78.3	19 32.6	77.3	19 28.0	76.2	19 22.9	75.1	40
30	22 07.6	79.2	22 03.8	78.1	21 58.9	77.1	21 53.5	76.0	21 47.8	74.9	30
20	24 35.7	79.0	24 30.6	77.9	24 25.1	76.8	24 19.0	75.7	24 12.5	74.6	20
10	27 02.8	78.8	26 57.2	77.6	26 51.0	76.5	26 44.3	75.4	26 37.1	74.3	10
4 00	29 29.9	78.5	29 23.7	77.4	29 16.8	76.2	29 09.4	75.1	29 01.3	74.0	4 00
3 50	31 56.8	78.2	31 49.8	77.0	31 42.2	75.9	31 34.1	74.7	31 25.3	73.5	3 50
40	34 23.5	77.9	34 16.0	76.6	34 07.7	75.5	33 58.7	74.3	33 49.0	73.1	40
30	36 50.1	77.5	36 41.7	76.2	36 32.7	75.0	36 22.9	73.8	36 13.3	72.5	30
20	39 16.4	77.0	39 07.4	75.8	38 57.4	74.5	38 46.7	73.2	38 35.2	72.0	20
10	41 42.4	76.5	41 32.5	75.2	41 21.7	73.9	41 10.1	72.6	40 57.7	71.3	10
3 00	44 08.2	76.0	43 57.4	74.6	43 45.7	73.3	43 33.0	71.9	43 19.4	70.6	3 00
2 50	46 33.5	75.4	46 21.7	74.0	46 08.9	72.5	45 55.3	71.1	45 40.5	69.7	2 50
40	48 58.4	74.7	48 45.7	73.2	48 31.8	71.7	48 16.8	70.3	48 00.7	68.8	40
30	51 22.7	73.9	51 08.8	72.4	50 53.9	70.8	50 37.5	69.2	50 20.0	67.7	30
20	53 46.5	72.9	53 31.4	71.3	53 15.0	69.7	52 57.3	68.1	52 38.3	66.5	20
10	56 09.4	71.8	55 53.0	70.1	55 35.1	68.4	55 15.8	66.8	54 55.1	65.1	10
2 00	58 31.5	70.6	58 13.5	68.8	57 53.9	67.0	57 32.8	65.2	57 10.3	63.5	2 00
1 50	60 52.4	69.1	60 32.4	67.2	60 11.0	65.3	59 48.0	63.4	59 23.6	61.6	1 50
40	63 11.6	67.3	62 49.8	65.3	62 26.1	63.3	62 01.0	61.4	61 34.1	59.4	40
30	65 29.0	65.2	65 04.8	63.1	64 38.8	61.0	64 11.0	58.9	63 41.6	56.9	30
20	67 43.9	62.7	67 17.0	60.4	66 48.2	58.2	66 17.5	56.0	65 45.1	53.9	20
10	69 55.2	59.6	69 27.2	57.1	68 53.4	54.8	68 19.2	52.5	67 43.5	50.3	10
1 00	72 02.1	55.7	71 28.5	53.1	70 52.6	50.6	70 15.0	48.3	69 35.5	46.1	1 00
0 50	74 02.5	50.8	73 24.5	48.1	72 44.2	45.5	72 02.3	43.2	71 19.3	41.0	0 50
40	75 53.6	44.6	75 10.5	41.8	74 25.6	39.2	73 39.1	36.9	72 51.2	34.9	40
30	77 31.4	36.5	76 42.7	33.9	75 52.7	31.5	75 01.5	29.5	74 09.0	27.6	30
20	78 49.9	26.3	77 55.8	24.2	77 00.8	22.3	76 05.2	20.7	75 09.0	19.3	20
10	79 41.7	13.9	78 43.4	12.6	77 44.8	11.6	76 46.0	10.7	75 47.0	9.9	10
0 00	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	75.0	0 00.0	74.0	0 00.0	73.0	0 00.0	72.0	0 00.0	71.0	6 00
5 50	2 24.9	75.0	2 24.2	74.0	2 23.4	73.0	2 22.6	72.0	2 21.8	71.0	5 50
40	4 49.8	74.9	4 48.4	74.0	4 46.9	72.9	4 45.3	71.9	4 43.6	70.9	40
30	7 14.5	74.9	7 12.4	73.9	7 10.2	72.9	7 07.9	71.8	7 05.3	70.8	30
20	9 39.4	74.8	9 36.5	73.8	9 33.5	72.8	9 30.4	71.7	9 27.0	70.7	20
10	12 04.1	74.7	12 00.5	73.6	11 56.8	72.6	11 52.8	71.6	11 48.5	70.6	10
5 00	14 28.7	74.5	14 24.4	73.5	14 19.7	72.4	14 15.0	71.4	14 09.9	70.4	5 00
4 50	16 53.1	74.3	16 48.1	73.3	16 42.8	72.2	16 37.0	71.2	16 31.1	70.1	4 50
40	19 17.4	74.1	19 11.7	73.0	19 05.5	72.0	18 59.0	70.9	18 52.1	69.9	40
30	21 41.6	73.8	21 35.0	72.8	21 28.0	71.7	21 20.6	70.6	21 12.7	69.6	30
20	24 05.6	73.5	23 58.2	72.4	23 50.3	71.4	23 41.9	70.3	23 33.1	69.2	20
10	26 29.3	73.2	26 20.9	72.1	26 12.2	71.0	26 03.0	69.9	25 53.2	68.8	10
4 00	28 52.7	72.8	28 43.6	71.7	28 33.9	70.6	28 23.6	69.4	28 12.8	68.3	4 00
3 50	31 16.0	72.4	31 05.7	71.2	30 55.0	70.1	30 43.9	68.9	30 31.9	67.8	3 50
40	33 38.6	71.9	33 27.6	70.7	33 15.9	69.5	33 03.5	68.4	32 50.5	67.2	40
30	36 01.0	71.3	35 48.9	70.1	35 36.2	68.9	35 22.7	67.7	35 08.5	66.5	30
20	38 22.8	70.7	38 09.7	69.5	37 55.8	68.3	37 41.1	67.0	37 25.7	65.8	20
10	40 44.1	70.0	40 29.9	68.7	40 14.7	67.5	39 58.8	66.2	39 42.2	65.0	10
3 00	43 04.8	69.2	42 49.3	67.9	42 32.9	66.6	42 15.6	65.3	41 57.5	64.1	3 00
2 50	45 24.7	68.4	45 07.8	67.0	44 50.1	65.7	44 31.4	64.3	44 11.7	63.0	2 50
40	47 43.6	67.4	47 25.4	66.0	47 06.1	64.6	46 45.9	63.2	46 24.7	61.8	40
30	50 01.4	66.3	49 41.7	64.8	49 20.9	63.3	48 59.0	61.9	48 36.1	60.5	30
20	52 18.1	65.0	51 56.7	63.4	51 34.1	61.9	51 10.5	60.5	50 45.7	59.0	20
10	54 33.1	63.5	54 10.7	61.9	53 45.5	60.3	53 20.0	58.7	52 53.1	57.3	10
2 00	56 46.5	61.8	56 21.2	60.2	55 54.8	58.6	55 27.0	57.0	54 58.2	55.5	2 00
1 50	58 57.4	59.9	58 30.1	58.2	58 01.3	56.5	57 31.4	54.8	57 00.0	53.3	1 50
40	61 05.7	57.6	60 35.9	55.9	60 04.7	54.1	59 32.2	52.5	58 58.4	50.9	40
30	63 10.6	55.0	62 38.0	53.2	62 04.3	51.4	61 28.9	49.7	60 52.3	48.0	30
20	65 11.2	51.9	64 35.6	50.0	63 58.7	48.2	63 20.5	46.5	62 41.1	44.8	20
10	67 06.3	48.3	66 27.6	46.4	65 47.3	44.5	65 06.0	42.8	64 23.5	41.1	10
1 00	68 54.6	44.0	68 12.2	42.1	67 28.5	40.3	66 43.8	38.5	65 57.9	36.9	1 00
0 50	70 34.0	38.9	69 47.9	37.1	69 00.4	35.3	68 12.3	33.7	67 23.0	32.2	0 50
40	72 02.1	32.9	71 12.1	31.1	70 21.1	29.6	69 29.4	28.2	68 37.0	26.8	40
30	73 15.8	26.0	72 22.3	24.5	71 27.8	23.1	70 32.8	21.9	69 37.5	20.8	30
20	74 12.5	18.0	73 15.4	16.9	72 18.0	15.9	71 20.4	15.0	70 22.6	14.2	20
10	74 47.9	9.2	73 48.7	8.7	72 49.3	8.1	71 50.0	7.6	70 50.5	7.2	10
0 00	75 0.0	0.0	74 0.0	0.0	73 0.0	0.0	72 0.0	0.0	71 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	70.0	0 00.0	69.0	0 00.0	68.0	0 00.0	67.0	0 00.0	66.0	6 00
5 50	2 21.0	70.0	2 20.1	69.0	2 19.1	68.0	2 18.0	67.0	2 17.0	66.0	5 50
40	4 41.9	69.9	4 40.0	68.9	4 38.1	67.9	4 36.1	66.9	4 34.0	65.9	40
30	7 02.7	69.8	7 00.0	68.8	6 57.0	67.8	6 54.0	66.8	6 50.8	65.8	30
20	9 23.5	69.7	9 19.8	68.7	9 15.9	67.7	9 11.9	66.7	9 07.7	65.7	20
10	11 44.2	69.6	11 39.5	68.5	11 34.5	67.5	11 29.6	66.5	11 24.2	65.5	10
5 00	14 04.6	69.4	13 59.0	68.3	13 53.1	67.3	13 47.0	66.3	13 40.6	65.3	5 00
4 50	16 24.7	69.1	16 18.2	68.1	16 11.4	67.0	16 04.2	66.0	15 56.7	65.0	4 50
40	18 44.8	68.8	18 37.2	67.8	18 29.3	66.7	18 21.0	65.7	18 12.4	64.7	40
30	21 04.5	68.5	20 56.0	67.4	20 46.8	66.4	20 37.5	65.3	20 27.7	64.2	30
20	23 23.9	68.1	23 14.3	67.0	23 04.1	66.0	22 53.6	64.9	22 42.6	63.8	20
10	25 42.9	67.7	25 32.2	66.6	25 20.8	65.5	25 09.4	64.4	24 56.9	63.4	10
4 00	28 01.5	67.2	27 49.6	66.1	27 37.1	65.0	27 24.2	63.9	27 10.7	62.8	4 00
3 50	30 19.5	66.6	30 06.4	65.5	29 52.7	64.4	29 38.5	63.3	29 23.7	62.2	3 50
40	32 36.9	66.0	32 22.6	64.9	32 07.6	63.8	32 52.1	62.6	31 36.0	61.5	40
30	34 53.5	65.3	34 38.1	64.2	34 21.8	63.0	34 04.8	61.9	33 47.2	60.7	30
20	37 09.5	64.6	36 52.6	63.4	36 34.9	62.2	36 16.6	61.0	35 57.6	59.8	20
10	39 24.5	63.8	39 06.2	62.5	38 47.1	61.3	38 27.2	60.1	38 06.6	58.8	10
3 00	41 38.5	62.8	41 18.6	61.5	40 58.0	60.3	40 36.5	59.0	40 14.4	57.8	3 00
2 50	43 51.2	61.7	43 29.7	60.4	43 07.4	59.1	42 44.3	57.9	42 20.4	56.7	2 50
40	46 02.5	60.5	45 39.4	59.2	45 15.4	57.9	44 50.5	56.6	44 24.7	55.3	40
30	48 12.2	59.1	47 47.2	57.8	47 21.4	56.4	46 54.6	55.1	46 26.9	53.8	30
20	50 19.9	57.6	49 53.0	56.2	49 25.2	54.8	48 56.5	53.5	48 26.8	52.2	20
10	52 25.4	55.9	51 56.5	54.4	51 26.5	53.1	50 55.6	51.7	50 23.7	50.3	10
2 00	54 28.1	53.9	53 57.0	52.5	53 24.9	51.1	52 51.7	49.7	52 17.6	48.3	2 00
1 50	56 27.7	51.8	55 54.2	50.2	55 19.6	48.8	54 44.1	47.4	54 07.6	46.0	1 50
40	58 23.5	49.3	57 47.5	47.8	57 10.4	46.3	56 32.3	44.9	55 53.3	43.5	40
30	60 14.7	46.4	59 35.9	44.9	58 56.2	43.4	58 15.5	42.0	57 33.9	40.6	30
20	62 00.6	43.2	61 19.0	41.7	60 36.4	40.3	59 52.9	38.9	59 08.6	37.5	20
10	63 32.0	39.6	62 57.4	38.1	62 09.7	36.6	61 23.4	35.3	60 36.4	34.0	10
1 00	65 11.1	35.4	64 23.5	34.0	63 35.1	32.7	62 45.8	31.4	61 56.1	30.2	1 00
0 50	66 33.1	30.7	65 42.5	29.4	64 51.0	28.2	63 59.1	27.0	63 06.7	25.9	0 50
40	67 43.9	25.5	66 50.3	24.3	65 56.2	23.3	65 01.7	22.3	64 06.8	21.3	40
30	68 41.5	19.7	67 45.4	18.8	66 49.0	17.9	65 52.2	17.1	64 55.2	16.3	30
20	69 24.6	13.5	68 26.4	12.8	67 28.0	12.2	66 29.5	11.6	65 30.9	11.1	20
10	69 51.0	6.8	68 51.5	6.5	67 51.9	6.2	66 52.3	5.9	65 52.9	5.6	10
0 00	70 0.0	0.0	69 0.0	0.0	68 0.0	0.0	67 0.0	0.0	66 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 01. 0	89. 0	0 02. 1	88. 0	0 03. 1	87. 0	0 04. 2	86. 0	6 00
5 50	2 30. 0	90. 0	2 31. 1	89. 0	2 31. 9	88. 0	2 33. 0	87. 0	2 33. 8	86. 0	5 50
40	5 00. 0	90. 1	5 00. 9	89. 1	5 01. 8	88. 1	5 02. 7	87. 1	5 03. 3	86. 1	40
30	7 30. 0	90. 1	7 30. 9	89. 1	7 31. 7	88. 1	7 32. 6	87. 1	7 33. 0	86. 1	30
20	9 59. 9	90. 2	10 00. 9	89. 2	10 01. 7	88. 2	10 02. 2	87. 1	10 02. 7	86. 1	20
10	12 29. 9	90. 2	12 30. 9	89. 2	12 31. 6	88. 2	12 32. 1	87. 1	12 32. 3	86. 1	10
5 00	14 59. 9	90. 3	15 00. 8	89. 2	15 01. 5	88. 2	15 01. 8	87. 2	15 01. 9	86. 1	5 00
4 50	17 29. 8	90. 3	17 30. 8	89. 3	17 31. 3	88. 2	17 31. 7	87. 2	17 31. 6	86. 1	4 50
40	19 59. 8	90. 4	20 00. 7	89. 3	20 01. 2	88. 2	20 01. 4	87. 2	20 01. 1	86. 1	40
30	22 29. 8	90. 4	22 30. 7	89. 3	22 31. 2	88. 2	22 31. 3	87. 2	22 30. 8	86. 1	30
20	24 59. 8	90. 5	25 00. 6	89. 4	25 01. 1	88. 3	25 01. 0	87. 2	25 00. 5	86. 1	20
10	27 29. 7	90. 5	27 30. 6	89. 4	27 31. 0	88. 3	27 30. 8	87. 1	27 30. 1	86. 0	10
4 00	29 59. 7	90. 6	30 00. 6	89. 4	30 00. 9	88. 3	30 00. 6	87. 1	29 59. 7	86. 0	4 00
3 50	32 29. 7	90. 6	32 30. 6	89. 4	32 30. 8	88. 3	32 30. 5	87. 1	32 29. 2	85. 9	3 50
40	34 59. 6	90. 7	35 00. 5	89. 5	35 00. 8	88. 3	35 00. 1	87. 0	34 58. 9	85. 8	40
30	37 29. 6	90. 7	37 30. 5	89. 5	37 30. 5	88. 2	37 30. 1	87. 0	37 28. 4	85. 7	30
20	39 59. 6	90. 8	40 00. 5	89. 5	40 00. 5	88. 2	39 59. 7	86. 9	39 57. 9	85. 6	20
10	42 29. 5	90. 9	42 30. 5	89. 6	42 30. 4	88. 2	42 29. 6	86. 8	42 27. 5	85. 5	10
3 00	44 59. 5	91. 0	45 00. 5	89. 6	45 00. 4	88. 2	44 59. 2	86. 8	44 57. 0	85. 4	3 00
2 50	47 29. 4	91. 1	47 30. 5	89. 6	47 30. 2	88. 1	47 29. 0	86. 6	47 26. 5	85. 2	2 50
40	49 59. 4	91. 2	50 00. 3	89. 6	50 00. 2	88. 1	49 58. 6	86. 5	49 55. 9	85. 0	40
30	52 29. 3	91. 3	52 30. 4	89. 7	52 30. 0	88. 0	52 28. 4	86. 4	52 25. 2	84. 7	30
20	54 59. 2	91. 4	55 00. 4	89. 7	54 59. 9	87. 9	54 58. 0	86. 2	54 54. 6	84. 5	20
10	57 29. 2	91. 6	57 30. 3	89. 7	57 29. 6	87. 8	57 27. 6	86. 0	57 23. 6	84. 1	10
2 00	59 59. 1	91. 7	60 00. 3	89. 7	59 59. 6	87. 7	59 57. 2	85. 7	59 53. 0	83. 8	2 00
1 50	62 29. 0	91. 9	62 30. 2	89. 8	62 29. 5	87. 6	62 26. 8	85. 4	62 21. 9	83. 3	1 50
40	64 58. 9	92. 1	65 00. 3	89. 8	64 59. 4	87. 4	64 56. 2	85. 1	64 50. 8	82. 7	40
30	67 28. 8	92. 4	67 30. 2	89. 8	67 29. 1	87. 2	67 25. 8	84. 6	67 19. 5	82. 0	30
20	69 58. 6	92. 8	70 00. 2	89. 8	69 58. 9	86. 9	69 54. 9	84. 0	69 47. 8	81. 1	20
10	72 28. 4	93. 2	72 30. 2	89. 8	72 28. 8	86. 5	72 23. 9	83. 3	72 15. 8	80. 0	10
1 00	74 58. 1	93. 7	75 00. 0	89. 8	74 58. 3	86. 0	74 52. 6	82. 2	74 43. 1	78. 4	1 00
0 50	77 27. 6	94. 5	77 30. 1	89. 9	77 28. 0	85. 3	77 21. 0	80. 7	77 09. 5	76. 3	0 50
40	79 57. 0	95. 7	86 00. 0	89. 9	79 57. 2	84. 2	79 48. 5	78. 6	79 34. 1	73. 1	40
30	82 26. 0	97. 6	82 30. 1	89. 9	82 25. 5	82 3	82 15. 0	75. 0	81 55. 5	68. 1	30
20	84 54. 1	101. 3	85 00. 0	89. 9	84 54. 2	78. 6	84 37. 1	68. 1	84 10. 4	58. 9	20
10	87 18. 4	111. 8	87 30. 1	90. 0	87 18. 5	68. 1	86 47. 9	51. 3	86 05. 8	39. 7	10
0 00	89 0. 0	180. 0	90 0. 0	Ind.	89 0. 0	0. 0	88 0. 0	0. 0	87 0. 0	0. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 05.2	85.0	0 06.3	84.0	0 07.3	83.0	0 08.4	82.0	0 09.4	81.0	6 00
5 50	2 34.7	85.0	2 35.5	84.0	2 36.2	83.0	2 36.9	82.0	2 37.6	81.0	5 50
40	5 04.1	85.1	5 04.6	84.1	5 05.1	83.1	5 05.4	82.1	5 05.7	81.1	40
30	7 33.4	85.1	7 33.8	84.1	7 33.9	83.1	7 33.9	82.1	7 33.8	81.1	30
20	10 02.9	85.1	10 02.9	84.1	10 02.8	83.1	10 02.5	82.1	10 02.0	81.0	20
10	12 32.4	85.1	12 32.2	84.1	12 31.8	83.1	12 31.2	82.0	12 30.1	81.0	10
5 00	15 01.7	85.1	15 01.3	84.1	15 00.5	83.0	14 59.5	82.0	14 58.2	81.0	5 00
4 50	17 31.2	85.1	17 30.6	84.0	17 29.5	83.0	17 28.1	81.9	17 26.4	80.9	4 50
40	20 00.6	85.0	19 59.6	84.0	19 58.3	82.9	19 56.5	81.9	19 54.4	80.8	40
30	22 30.0	85.0	22 28.9	83.9	22 27.1	82.8	22 24.9	81.8	22 22.4	80.7	30
20	24 59.4	85.0	24 57.8	83.9	24 55.8	82.8	24 53.4	81.7	24 50.3	80.6	20
10	27 28.8	84.9	27 27.0	83.8	27 24.6	82.6	27 21.7	81.5	27 18.3	80.4	10
4 00	29 58.2	84.8	29 56.0	83.7	29 53.3	82.5	29 50.0	81.4	29 46.2	80.2	4 00
3 50	32 27.7	84.7	32 25.2	83.5	32 22.1	82.3	32 18.3	81.2	32 13.9	80.0	3 50
40	34 56.8	84.6	34 54.1	83.4	34 50.6	82.2	34 46.4	81.0	34 41.5	79.7	40
30	37 26.2	84.5	37 22.8	83.2	37 19.2	82.0	37 14.5	80.7	37 09.1	79.4	30
20	39 55.4	84.3	39 51.9	83.0	39 47.6	81.7	39 42.5	80.4	39 36.4	79.1	20
10	42 24.7	84.1	42 20.9	82.8	42 16.0	81.4	42 10.3	80.1	42 03.6	78.8	10
3 00	44 53.8	83.9	44 49.5	82.5	44 44.2	81.1	44 37.9	79.7	44 30.5	78.3	3 00
2 50	47 22.9	83.7	47 18.2	82.2	47 12.4	80.8	47 05.4	79.3	46 57.3	77.8	2 50
40	49 51.9	83.4	49 46.7	81.9	49 40.2	80.4	49 32.6	78.8	49 23.8	77.3	40
30	52 20.9	83.1	52 15.2	81.5	52 08.0	79.9	51 59.5	78.2	51 49.9	76.7	30
20	54 49.7	82.7	54 43.3	81.0	54 35.5	79.3	54 26.4	77.6	54 15.6	75.9	20
10	57 18.5	82.3	57 11.4	80.5	57 02.7	78.6	56 52.5	76.8	56 40.7	75.0	10
2 00	59 46.9	81.8	59 39.1	79.8	59 29.5	77.9	59 18.4	75.9	59 05.3	74.0	2 00
1 50	62 15.1	81.1	62 06.5	79.0	61 56.0	76.9	61 43.2	74.9	61 29.0	72.8	1 50
40	64 43.3	80.4	64 33.4	78.1	64 21.7	75.8	64 07.8	73.6	63 51.8	71.4	40
30	67 10.9	79.5	67 00.1	76.9	66 46.7	74.4	66 30.8	72.0	66 13.0	69.6	30
20	69 38.2	78.3	69 25.5	75.5	69 10.5	72.7	68 52.8	70.1	68 32.8	67.5	20
10	72 04.5	76.8	71 50.2	73.6	71 32.8	70.6	71 12.8	67.6	71 50.0	64.8	10
1 00	74 30.0	74.8	74 13.2	71.2	73 53.2	67.8	73 30.0	64.5	73 03.8	61.4	1 00
0 50	76 53.8	72.1	76 34.0	68.0	76 10.0	64.0	75 43.0	60.3	75 12.3	56.9	0 50
40	79 14.6	68.0	78 50.2	63.2	78 21.7	58.7	77 49.5	54.6	77 13.7	51.0	40
30	81 30.5	61.7	81 00.2	56.1	80 25.0	51.1	79 45.5	46.7	79 03.5	42.8	30
20	83 36.1	51.2	82 56.1	44.8	82 11.8	39.6	81 24.4	35.3	80 34.6	31.7	20
10	85 17.1	51.9	84 24.7	26.5	83 30.2	22.5	82 34.2	19.5	81 37.3	17.2	10
0 00	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 10.4	80.0	0 11.4	79.0	0 12.5	78.0	0 13.5	77.0	0 14.6	76.0	6 00
5 50	2 38.1	80.0	2 38.7	79.0	2 39.2	78.0	2 39.6	77.0	2 40.1	76.0	5 50
40	5 05.8	80.1	5 05.9	79.0	5 05.9	78.0	5 05.8	77.0	5 05.7	76.0	40
30	7 33.6	80.0	7 33.1	79.0	7 32.6	78.0	7 31.9	77.0	7 31.1	76.0	30
20	10 01.3	80.0	10 00.4	79.0	9 59.4	78.0	9 58.1	77.0	9 56.7	76.0	20
10	12 29.0	80.0	12 27.6	79.0	12 26.0	78.0	12 24.3	76.9	12 22.2	75.9	10
5 00	14 56.6	79.9	14 54.8	78.9	14 52.6	77.9	14 50.2	76.8	14 47.6	75.8	5 00
4 50	17 24.3	79.8	17 21.9	78.8	17 19.2	77.7	17 16.3	76.7	17 12.9	75.7	4 50
40	19 51.9	79.7	19 49.0	78.7	19 45.8	77.6	19 42.1	76.5	19 38.2	75.5	40
30	22 19.4	79.6	22 16.0	78.5	22 12.3	77.5	22 07.9	76.4	22 03.3	75.3	30
20	24 46.9	79.5	24 42.9	78.4	24 38.6	77.3	24 33.6	76.2	24 28.3	75.1	20
10	27 14.1	79.3	27 09.8	78.1	27 04.8	77.0	26 59.1	75.9	26 53.0	74.8	10
4 00	29 41.5	79.1	29 36.5	77.9	29 30.8	76.8	29 24.5	75.6	29 17.7	74.5	4 00
3 50	32 08.8	78.8	32 03.0	77.6	31 56.8	76.5	31 49.8	75.3	31 41.9	74.1	3 50
40	34 35.8	78.5	34 29.5	77.3	34 22.4	76.1	34 14.6	74.9	34 06.2	73.7	40
30	37 02.7	78.2	36 55.7	77.0	36 47.9	75.7	36 39.3	74.5	36 29.9	73.2	30
20	39 29.5	77.9	39 21.7	76.6	39 13.1	75.3	39 03.6	74.0	38 53.4	72.7	20
10	41 56.0	77.4	41 47.4	76.1	41 38.0	74.8	41 27.6	73.5	41 16.3	72.1	10
3 00	44 22.2	77.0	44 12.8	75.6	44 02.5	74.2	43 51.2	72.8	43 38.9	71.5	3 00
2 50	46 48.2	76.4	46 37.8	75.0	46 26.4	73.5	46 14.1	72.1	46 00.7	70.7	2 50
40	49 13.7	75.8	49 02.6	74.3	48 50.1	72.8	48 36.7	71.3	48 21.9	69.9	40
30	51 38.8	75.1	51 26.6	73.5	51 13.1	71.9	50 58.3	70.4	50 42.3	68.8	30
20	54 03.5	74.2	53 50.1	72.6	53 35.2	70.9	53 19.1	69.3	53 01.7	67.7	20
10	56 27.5	73.3	56 12.8	71.5	55 56.5	69.7	55 38.9	68.1	55 19.6	66.4	10
2 00	58 50.8	72.1	58 34.4	70.3	58 16.7	68.5	57 57.4	66.7	57 36.5	64.9	2 00
1 50	61 13.0	70.8	60 55.0	68.8	60 35.4	66.9	60 14.0	65.0	59 51.3	63.2	1 50
40	63 33.8	69.2	63 14.0	67.1	62 52.3	65.1	62 29.0	63.0	62 03.9	61.1	40
30	65 53.0	67.3	65 30.8	65.0	65 07.2	62.8	64 41.3	60.7	64 13.6	58.6	30
20	68 10.3	65.0	67 45.7	62.5	67 19.0	60.2	66 50.3	57.9	66 19.8	55.7	20
10	70 24.6	62.0	69 56.6	59.4	69 27.0	56.9	68 55.0	54.5	68 21.0	52.2	10
1 00	72 34.8	58.4	72 03.5	55.6	71 29.9	52.9	70 54.0	50.4	70 16.4	48.1	1 00
0 50	74 39.3	53.7	74 03.5	50.7	73 25.5	47.9	72 45.5	45.4	72 03.6	43.0	0 50
40	76 35.3	47.5	75 54.4	44.5	75 11.4	41.6	74 26.5	39.1	73 39.9	36.8	40
30	78 18.5	39.4	77 31.5	36.4	76 43.5	33.8	75 53.3	31.4	75 01.8	29.4	30
20	79 43.1	28.7	78 50.1	26.2	77 56.1	24.1	77 01.2	22.3	76 05.5	20.6	20
10	80 39.8	15.4	79 41.8	13.9	78 43.4	12.6	77 44.8	11.5	76 46.0	10.7	10
0 00	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 15.5	75.0	0 16.6	74.0	0 17.5	73.0	0 18.5	72.0	0 19.6	71.0	6 00
5 50	2 40.4	75.0	2 40.8	74.0	2 40.9	73.0	2 41.1	72.0	2 41.4	71.0	5 50
40	5 05.3	75.0	5 04.9	74.0	5 04.4	73.0	5 03.8	72.0	5 03.2	71.0	40
30	7 30.3	75.0	7 29.1	74.0	7 27.8	73.0	7 26.4	72.0	7 25.0	71.0	30
20	9 55.0	75.0	9 53.2	73.9	9 51.2	72.9	9 49.0	71.9	9 46.8	70.9	20
10	12 19.9	74.9	12 17.3	73.8	12 14.6	72.8	12 11.6	71.8	12 08.5	70.8	10
5 00	14 44.6	74.7	14 41.3	73.7	14 37.8	72.7	14 34.0	71.7	14 30.0	70.6	5 00
4 50	17 09.3	74.6	17 05.2	73.6	17 00.9	72.5	16 56.3	71.5	16 51.3	70.4	4 50
40	19 33.8	74.4	19 29.0	73.4	19 23.9	72.3	19 18.3	71.3	19 12.6	70.2	40
30	21 58.2	74.2	21 52.6	73.2	21 46.7	72.1	21 40.3	71.0	21 33.6	69.9	30
20	24 22.4	74.0	24 16.0	72.9	24 09.2	71.8	24 01.9	70.7	23 54.4	69.6	20
10	26 46.5	73.7	26 39.3	72.6	26 31.6	71.5	26 23.3	70.4	26 14.7	69.2	10
4 00	29 10.2	73.3	29 02.2	72.2	28 53.6	71.1	28 44.4	70.0	28 34.8	68.8	4 00
3 50	31 33.8	72.9	31 24.7	71.8	31 15.3	70.6	31 05.2	69.5	30 54.3	68.4	3 50
40	33 57.0	72.5	33 47.1	71.3	33 36.6	70.2	33 25.3	69.0	33 13.6	67.8	40
30	36 19.1	72.0	36 09.1	70.8	35 57.4	69.6	35 45.1	68.4	35 32.1	67.2	30
20	38 42.3	71.5	38 30.4	70.2	38 17.7	69.0	38 04.1	67.7	37 49.9	66.5	20
10	41 04.3	70.8	40 51.3	69.5	40 37.3	68.3	40 22.7	67.0	40 07.1	65.7	10
3 00	43 25.6	70.1	43 11.5	68.8	42 56.2	67.5	42 40.2	66.2	42 23.4	64.9	3 00
2 50	45 46.4	69.3	45 30.8	67.9	45 14.4	66.6	44 56.9	65.2	44 38.5	63.9	2 50
40	48 06.3	68.4	47 49.4	67.0	47 31.5	65.6	47 12.5	64.2	46 52.7	62.8	40
30	50 25.1	67.3	50 06.8	65.9	49 47.3	64.4	49 26.8	62.9	49 05.2	61.5	30
20	52 42.9	66.1	52 23.0	64.6	52 01.8	63.1	51 39.5	61.6	51 16.2	60.1	20
10	54 59.4	64.8	54 37.5	63.2	54 14.7	61.6	53 50.5	60.0	53 25.0	58.5	10
2 00	57 14.2	63.2	56 50.5	61.5	56 25.5	59.9	55 59.1	58.2	55 31.8	56.7	2 00
1 50	59 27.0	61.3	59 01.0	59.6	58 33.9	57.8	58 05.3	56.2	57 35.5	54.6	1 50
40	61 37.2	59.2	61 09.0	57.3	60 39.3	55.5	60 08.2	53.8	59 36.0	52.2	40
30	63 44.3	56.7	63 13.4	54.7	62 41.0	52.9	62 07.1	51.1	61 32.0	49.4	30
20	65 47.4	53.7	65 13.6	51.7	64 38.0	49.8	64 01.2	48.0	63 23.3	46.2	20
10	67 45.5	50.1	67 08.2	48.1	66 29.6	46.1	65 49.4	44.3	65 08.1	42.6	10
1 00	69 37.0	45.9	68 56.2	43.8	68 13.8	41.9	67 30.1	40.0	66 45.7	38.3	1 00
0 50	71 20.0	40.9	70 35.1	38.8	69 49.0	36.9	69 01.8	35.1	68 13.5	33.5	0 50
40	72 52.1	34.7	72 03.0	32.8	71 13.0	31.0	70 21.8	29.5	69 30.5	28.0	40
30	74 09.8	27.5	73 16.5	25.9	72 22.7	24.4	71 28.2	23.0	70 33.5	21.8	30
20	75 09.4	19.2	74 12.7	17.9	73 15.7	16.8	72 18.2	15.8	71 20.9	14.9	20
10	75 47.0	9.9	74 47.9	9.2	73 48.7	8.6	72 49.3	8.1	71 50.0	7.6	10
0 00	76 0.0	0.0	75 0.0	0.0	74 0.0	0.0	73 0.0	0.0	72 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 20. 5	70. 0	0 21. 5	69. 0	0 22. 5	68. 0	0 23. 4	67. 0	0 24. 3	66. 0	6 00
5 50	2 41. 5	70. 0	2 41. 6	69. 0	2 41. 6	68. 0	2 41. 5	67. 0	2 41. 5	66. 0	5 50
40	5 02. 4	70. 0	5 01. 6	69. 0	5 00. 6	68. 0	4 59. 5	67. 0	4 58. 4	66. 0	40
30	7 23. 3	70. 0	7 21. 6	69. 0	7 19. 6	68. 0	7 17. 6	67. 0	7 15. 3	66. 0	30
20	9 44. 2	69. 9	9 41. 5	68. 9	9 38. 6	67. 9	9 35. 5	66. 8	9 32. 2	65. 8	20
10	12 44. 9	69. 7	12 01. 3	68. 7	11 57. 4	67. 7	11 53. 3	66. 7	11 49. 1	65. 7	10
5 00	14 25. 6	69. 6	14 21. 0	68. 6	14 16. 1	67. 5	14 11. 0	66. 5	14 05. 6	65. 4	5 00
4 50	16 46. 1	69. 4	16 40. 6	68. 4	16 34. 6	67. 3	16 28. 4	66. 3	16 21. 9	65. 2	4 50
40	19 06. 3	69. 2	18 59. 8	68. 1	19 52. 8	67. 1	19 45. 5	66. 0	18 37. 9	64. 9	40
30	21 26. 3	68. 9	21 18. 8	67. 8	21 10. 8	66. 8	21 12. 4	65. 7	20 53. 6	64. 6	30
20	23 46. 1	68. 5	23 37. 5	67. 4	23 28. 4	66. 4	23 18. 8	65. 3	23 08. 9	64. 2	20
10	26 05. 5	68. 1	25 55. 8	67. 0	25 45. 5	66. 0	25 34. 9	64. 9	25 23. 7	63. 8	10
4 00	28 24. 5	67. 7	28 13. 6	66. 6	28 02. 2	65. 5	27 50. 3	64. 4	27 37. 9	63. 2	4 00
3 50	30 42. 9	67. 2	30 31. 1	66. 1	30 18. 4	64. 9	30 05. 3	63. 8	29 51. 5	62. 7	3 50
40	33 00. 9	66. 6	32 47. 8	65. 5	32 33. 9	64. 4	32 19. 4	63. 2	32 04. 3	62. 0	40
30	35 18. 2	66. 0	35 03. 9	64. 8	34 48. 7	63. 6	34 32. 9	62. 5	34 16. 4	61. 3	30
20	37 34. 9	65. 3	37 19. 2	64. 1	37 02. 5	62. 9	36 45. 3	61. 7	36 27. 3	60. 5	20
10	39 50. 7	64. 5	39 33. 6	63. 2	39 15. 6	62. 0	38 56. 8	60. 8	38 37. 3	59. 5	10
3 00	42 05. 5	63. 6	41 46. 9	62. 3	41 27. 3	61. 0	41 07. 0	59. 8	40 45. 9	58. 5	3 00
2 50	44 19. 2	62. 6	43 59. 1	61. 2	43 37. 9	59. 9	43 15. 9	58. 6	42 53. 1	57. 3	2 50
40	46 31. 6	61. 4	46 09. 7	60. 0	45 46. 9	58. 7	45 23. 1	57. 4	44 58. 5	56. 1	40
30	48 42. 5	60. 1	48 18. 8	58. 7	47 54. 2	57. 3	47 28. 5	56. 0	47 02. 0	54. 7	30
20	50 51. 6	58. 6	50 25. 9	57. 2	49 59. 3	55. 8	49 31. 7	54. 4	49 03. 1	53. 0	20
10	52 58. 4	57. 0	52 30. 9	55. 5	52 02. 1	54. 1	51 32. 4	52. 7	51 01. 6	51. 2	10
2 00	55 02. 9	55. 1	54 33. 1	53. 6	54 02. 0	52. 1	53 30. 1	50. 7	52 57. 0	49. 3	2 00
1 50	57 04. 4	53. 0	56 32. 2	51. 4	55 58. 7	49. 9	55 24. 2	48. 4	54 48. 7	47. 0	1 50
40	59 02. 1	50. 6	58 27. 4	48. 9	57 51. 3	47. 4	57 14. 3	45. 9	56 36. 4	44. 5	40
30	60 55. 6	47. 8	60 18. 0	46. 1	59 39. 2	44. 6	58 59. 7	43. 1	58 19. 1	41. 6	30
20	62 43. 7	44. 6	62 03. 3	43. 0	61 21. 7	41. 4	60 39. 2	40. 0	59 55. 8	38. 5	20
10	64 25. 6	40. 9	63 42. 1	39. 3	62 57. 4	37. 8	62 12. 0	36. 4	61 25. 7	35. 0	10
1 00	65 59. 5	36. 8	65 12. 9	35. 2	64 25. 1	33. 8	63 36. 7	32. 4	62 47. 6	31. 1	1 00
0 50	67 24. 2	32. 0	66 34. 5	30. 6	65 43. 6	29. 2	64 52. 5	28. 0	64 10. 4	26. 8	0 50
40	68 37. 6	26. 6	67 44. 7	25. 4	66 51. 0	24. 2	65 56. 9	23. 1	65 02. 5	22. 1	40
30	69 37. 7	20. 7	68 42. 0	19. 6	67 45. 9	18. 7	66 49. 5	17. 8	65 52. 7	17. 0	30
20	70 22. 8	14. 1	69 24. 8	13. 4	68 26. 5	12. 7	67 28. 0	12. 1	66 29. 6	11. 5	20
10	70 50. 6	7. 2	69 51. 1	6. 8	68 51. 6	6. 5	67 52. 0	6. 1	66 52. 4	5. 8	10
0 00	71 0. 0	0. 0	70 0. 0	0. 0	69 0. 0	0. 0	68 0. 0	0. 0	67 0. 0	0. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 30. 0	90. 0	2 29. 0	91. 0	2 27. 8	92. 0	2 26. 7	93. 0	2 25. 4	94. 0	5 50
40	5 00. 0	90. 1	4 58. 8	91. 1	4 57. 6	92. 1	4 56. 3	93. 1	4 54. 9	94. 1	40
30	7 30. 0	90. 1	7 28. 9	91. 1	7 27. 5	92. 1	7 26. 1	93. 1	7 24. 6	94. 1	30
20	9 59. 9	90. 2	9 58. 7	91. 2	9 57. 4	92. 2	9 55. 9	93. 2	9 54. 1	94. 2	20
10	12 29. 9	90. 2	12 28. 8	91. 2	12 27. 2	92. 2	12 25. 6	93. 3	12 23. 8	94. 3	10
5 00	14 59. 9	90. 3	14 58. 6	91. 3	14 57. 1	92. 3	14 55. 3	93. 4	14 53. 3	94. 4	5 00
4 50	17 29. 8	90. 3	17 28. 7	91. 4	17 26. 9	92. 4	17 25. 1	93. 5	17 22. 8	94. 5	4 50
40	19 59. 8	90. 4	19 58. 5	91. 4	19 56. 8	92. 5	19 54. 7	93. 6	19 52. 2	94. 6	40
30	22 29. 8	90. 4	22 28. 5	91. 5	22 26. 7	92. 6	22 24. 5	93. 7	22 21. 8	94. 7	30
20	24 59. 8	90. 5	24 58. 3	91. 6	24 56. 4	92. 7	24 54. 1	93. 8	24 51. 2	94. 9	20
10	27 29. 7	90. 5	27 28. 3	91. 7	27 26. 2	92. 8	27 23. 7	93. 9	27 20. 7	95. 0	10
4 00	29 59. 7	90. 6	29 58. 2	91. 7	29 56. 1	92. 9	29 53. 3	94. 0	29 50. 0	95. 2	4 00
3 50	32 29. 7	90. 6	32 28. 2	91. 8	32 25. 8	93. 0	32 23. 0	94. 2	32 19. 4	95. 4	3 50
40	34 59. 6	90. 7	34 57. 9	91. 9	34 55. 6	93. 1	34 52. 5	94. 4	34 48. 6	95. 6	40
30	37 29. 6	90. 7	37 27. 9	92. 0	37 25. 2	93. 3	37 22. 0	94. 6	37 18. 0	95. 8	30
20	39 59. 6	90. 8	39 57. 8	92. 2	39 55. 1	93. 5	39 51. 5	94. 8	39 47. 0	96. 1	20
10	42 29. 5	90. 9	42 27. 8	92. 3	42 24. 8	93. 6	42 21. 0	95. 0	42 16. 2	96. 3	10
3 00	44 59. 5	91. 0	44 57. 5	92. 4	44 54. 4	93. 8	44 50. 3	95. 2	44 45. 2	96. 6	3 00
2 50	47 29. 4	91. 1	47 27. 4	92. 6	47 24. 0	94. 0	47 19. 6	95. 5	47 14. 2	97. 0	2 50
40	49 59. 4	91. 2	49 57. 1	92. 8	49 53. 7	94. 3	49 48. 9	95. 9	49 42. 9	97. 4	40
30	52 29. 3	91. 3	52 27. 0	92. 9	52 23. 1	94. 6	52 18. 0	96. 2	52 11. 6	97. 9	30
20	54 59. 2	91. 4	54 56. 7	93. 2	54 52. 6	94. 9	54 47. 1	96. 6	54 40. 0	98. 4	20
10	57 29. 2	91. 6	57 26. 4	93. 4	57 21. 9	95. 3	57 15. 9	97. 1	57 08. 2	99. 0	10
2 00	59 59. 1	91. 7	59 56. 1	93. 7	59 51. 3	95. 7	59 44. 7	97. 7	59 36. 3	99. 7	2 00
1 50	62 29. 0	91. 9	62 25. 8	94. 0	62 20. 4	96. 2	62 13. 1	98. 3	62 04. 0	100. 5	1 50
40	64 58. 9	92. 1	64 55. 3	94. 4	64 49. 6	96. 8	64 41. 6	99. 2	64 31. 2	101. 6	40
30	67 28. 8	92. 4	67 24. 8	95. 0	67 18. 2	97. 6	67 09. 2	100. 1	66 58. 0	102. 7	30
20	69 58. 6	92. 8	69 54. 1	95. 7	69 46. 8	98. 5	69 36. 7	101. 3	69 23. 8	104. 2	20
10	72 28. 4	93. 2	72 23. 5	96. 5	72 14. 8	99. 7	72 03. 2	102. 9	71 48. 8	106. 0	10
1 00	74 58. 1	93. 7	74 52. 0	97. 6	74 42. 3	101. 3	74 28. 8	105. 0	74 11. 9	108. 5	1 00
0 50	77 27. 6	94. 5	77 20. 5	99. 0	77 08. 5	103. 5	76 52. 1	107. 8	76 32. 8	111. 9	0 50
40	79 57. 0	95. 7	79 48. 1	101. 3	79 33. 7	106. 7	79 14. 0	111. 8	78 49. 5	116. 6	40
30	82 26. 0	97. 6	82 14. 5	104. 9	81 55. 0	111. 8	81 30. 0	118. 1	80 59. 5	123. 8	30
20	84 54. 1	101. 3	84 37. 1	111. 8	84 10. 2	120. 9	83 35. 9	128. 7	82 55. 9	135. 1	20
10	87 18. 4	111. 8	86 47. 9	128. 7	86 05. 7	140. 2	85 17. 0	148. 0	84 24. 6	153. 5	10
0 00	89 0. 0	180. 0	88 0. 0	180. 0	87 0. 0	180. 0	86 0. 0	180. 0	85 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 24.2	95.0	2 22.9	96.0	2 21.5	97.0	2 20.2	98.0	2 18.8	99.0	5 50
40	4 53.6	95.1	4 52.0	96.1	4 50.4	97.1	4 48.7	98.1	4 46.8	99.1	40
30	7 22.9	95.2	7 21.1	96.2	7 19.2	97.2	7 17.1	98.2	7 14.9	99.2	30
20	9 52.3	95.3	9 50.1	96.3	9 47.9	97.3	9 45.5	98.3	9 42.9	99.3	20
10	12 21.7	95.4	12 19.4	96.4	12 16.8	97.4	12 14.0	98.4	12 10.9	99.4	10
5 00	14 50.9	95.5	14 48.3	96.5	14 45.4	97.5	14 42.2	98.5	14 38.8	99.6	5 00
4 50	17 20.2	95.6	17 17.4	96.6	17 14.2	97.7	17 10.6	98.7	17 06.7	99.8	4 50
40	19 49.5	95.7	19 46.3	96.8	19 42.7	97.8	19 38.8	98.9	19 34.5	99.9	40
30	22 18.6	95.8	22 15.2	96.9	22 11.3	98.0	22 06.9	99.1	22 02.2	100.1	30
20	24 47.9	96.0	24 44.0	97.1	24 39.7	98.2	24 35.0	99.3	24 29.7	100.4	20
10	27 17.0	96.2	27 12.8	97.3	27 08.2	98.4	27 02.9	99.5	26 57.2	100.6	10
4 00	29 46.1	96.3	29 41.5	97.5	29 36.5	98.6	29 30.8	99.8	29 24.6	100.9	4 0
3 50	32 15.2	96.5	32 10.3	97.7	32 04.8	98.9	31 58.6	100.1	31 51.8	101.2	3 50
40	34 44.1	96.8	34 38.8	98.0	34 32.8	99.2	34 26.1	100.4	34 18.7	101.6	40
30	37 13.0	97.1	37 07.3	98.3	37 00.8	99.5	36 53.6	100.8	36 45.6	102.0	30
20	39 41.8	97.4	39 35.7	98.6	39 28.7	99.9	39 20.8	101.2	39 12.1	102.5	20
10	42 10.5	97.7	42 03.9	99.0	41 56.3	100.3	41 47.7	101.7	41 38.5	103.0	10
3 00	44 39.1	98.0	44 31.9	99.4	44 23.7	100.8	44 14.5	102.2	44 04.3	103.6	3 00
2 50	47 07.5	98.5	46 59.8	99.9	46 50.9	101.4	46 40.9	102.8	46 29.9	104.2	2 50
40	49 35.7	98.9	49 27.4	100.5	49 17.7	102.0	49 07.0	103.5	48 55.1	105.0	40
30	52 03.9	99.5	51 54.8	101.1	51 44.1	102.6	51 32.4	104.3	51 19.7	105.8	30
20	54 31.6	100.1	54 21.7	101.8	54 10.4	103.4	53 57.8	105.1	53 43.7	106.7	20
10	56 59.1	100.7	56 48.2	102.6	56 36.0	104.4	56 22.1	106.1	56 06.8	107.8	10
2 00	59 26.3	101.6	59 14.5	103.5	59 01.0	105.4	58 45.9	107.3	58 29.1	109.1	2 00
1 50	61 52.8	102.6	61 39.9	104.6	61 25.2	106.6	61 08.5	108.7	60 50.2	110.6	1 50
40	64 19.0	103.7	64 04.5	106.0	63 48.3	108.1	63 29.9	110.3	63 09.8	112.4	40
30	66 44.2	105.2	66 28.2	107.6	66 10.0	109.9	65 49.6	112.3	65 27.2	114.5	30
20	69 08.5	106.9	68 50.4	109.5	68 30.0	112.1	68 07.2	114.7	67 42.5	117.0	20
10	71 31.0	109.1	71 10.6	112.0	70 47.4	114.8	70 22.0	117.6	69 54.0	120.1	10
1 00	73 51.8	112.0	73 28.0	115.2	73 01.6	118.4	72 32.8	121.3	72 01.3	124.1	1 00
0 50	76 09.0	115.8	75 41.5	119.4	75 11.0	122.9	74 37.6	126.0	74 01.5	129.0	0 50
40	78 20.8	121.1	77 48.4	125.2	77 12.6	128.9	76 34.1	132.1	75 53.0	135.3	40
30	80 24.0	128.8	79 45.0	133.2	79 02.7	137.0	78 17.7	140.2	77 31.0	143.4	30
20	82 11.5	140.3	81 24.1	144.6	80 34.3	148.1	79 42.7	151.1	78 49.7	153.6	20
10	83 30.1	157.4	82 34.1	160.4	81 37.2	162.7	80 39.7	164.6	79 41.7	166.1	10
0 00	84 0.0	180.0	83 0.0	180.0	82 0.0	180.0	81 0.0	180.0	80 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 17.2	100.0	2 15.7	101.0	2 14.2	102.0	2 12.7	103.0	2 11.0	104.0	5 50
40	4 44.9	100.1	4 43.0	101.1	4 40.9	102.1	4 38.7	103.1	4 36.5	104.1	40
30	7 12.6	100.2	7 10.0	101.2	7 07.4	102.2	7 04.7	103.2	7 01.8	104.2	30
20	9 40.1	100.3	9 37.2	101.4	9 34.0	102.4	9 30.7	103.4	9 27.2	104.4	20
10	12 07.7	100.4	12 04.2	101.5	12 00.4	102.5	11 56.7	103.5	11 52.5	105.5	10
5 00	14 35.1	100.6	14 31.1	101.6	14 26.8	102.7	14 22.3	103.7	14 17.6	104.7	5 00
4 50	17 02.5	100.8	16 57.9	101.8	16 53.1	102.9	16 48.1	103.9	16 42.6	104.9	4 50
40	19 29.8	101.0	19 24.7	102.0	19 19.3	103.1	19 13.5	104.2	19 07.4	105.2	40
30	21 56.9	101.2	21 51.4	102.3	21 45.3	103.4	21 38.9	104.5	21 32.0	105.5	30
20	24 24.0	101.5	24 17.8	102.6	24 11.2	103.6	24 04.0	104.7	23 56.5	105.8	20
10	26 50.7	101.8	26 44.1	102.9	26 36.8	103.9	26 28.9	105.1	26 20.6	106.2	10
4 00	29 17.6	102.1	29 10.2	103.2	29 02.2	104.3	28 53.6	105.5	28 44.5	106.6	4 00
3 50	31 44.2	102.4	31 36.1	103.6	31 27.4	104.7	31 18.1	105.9	31 07.9	107.1	3 50
40	34 10.6	102.8	34 01.8	104.0	33 52.3	105.2	33 42.1	106.4	33 31.3	107.6	40
30	36 36.7	103.3	36 27.1	104.5	36 16.8	105.7	36 05.8	106.9	35 53.9	108.2	30
20	39 02.6	103.8	38 52.2	105.0	38 41.0	106.3	38 29.0	107.5	38 16.3	108.8	20
10	41 28.1	104.3	41 16.8	105.6	41 04.7	106.9	40 51.8	108.2	40 37.9	109.5	10
3 00	43 53.2	104.9	43 41.0	106.3	43 27.9	107.6	43 13.9	109.0	42 59.0	110.3	3 00
2 50	46 17.9	105.6	46 04.7	107.1	45 50.4	108.4	45 35.3	109.8	45 19.2	111.2	2 50
40	48 41.9	106.4	48 27.8	107.9	48 12.4	109.4	47 56.1	110.8	47 38.6	112.2	40
30	51 05.4	107.3	50 50.0	108.9	50 33.6	110.4	50 15.7	111.9	49 56.9	113.4	30
20	53 28.3	108.4	53 11.6	110.0	52 53.5	111.6	52 34.3	113.1	52 13.9	114.7	20
10	55 50.1	109.6	55 31.9	111.3	55 12.3	113.0	54 51.5	114.6	54 29.2	116.2	10
2 00	58 10.9	111.0	57 50.9	112.7	57 29.7	114.5	57 07.1	116.2	56 43.0	117.9	2 00
1 50	60 30.2	112.6	60 08.5	114.4	59 45.2	116.3	59 20.5	118.1	58 54.3	119.8	1 50
40	62 47.7	114.5	62 23.9	116.4	61 58.4	118.4	61 31.5	120.3	61 03.0	122.1	40
30	65 02.8	116.7	64 36.5	118.8	64 08.8	120.9	63 39.3	122.9	63 08.1	124.8	30
20	67 15.3	119.4	66 46.5	121.6	66 15.7	123.8	65 43.2	125.9	65 09.2	127.8	20
10	69 24.0	122.7	68 51.6	125.0	68 17.7	127.3	67 42.1	129.5	67 04.5	131.5	10
1 00	71 27.4	126.7	70 51.5	129.2	70 13.7	131.5	69 34.2	133.8	68 53.2	135.8	1 00
0 50	73 23.5	131.7	72 43.4	134.3	72 01.4	136.6	71 18.0	138.9	70 32.9	140.9	0 50
40	75 09.9	138.0	74 25.0	140.6	73 38.5	142.8	72 50.7	145.0	72 01.5	146.9	40
30	76 42.4	145.9	75 52.0	148.4	75 01.0	150.4	74 09.0	152.3	73 15.5	153.9	30
20	77 55.6	155.6	77 00.8	157.6	76 05.0	159.2	75 08.8	160.7	74 12.2	161.9	20
10	78 43.3	167.3	77 44.7	168.4	76 45.9	169.3	75 47.2	170.0	74 47.8	170.7	0 10
0 00	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 09.4	105.0	2 07.7	106.0	2 05.8	107.1	2 04.1	108.1	2 02.2	109.1	5 50
40	4 34.1	105.1	4 31.7	106.1	4 29.2	107.2	4 26.6	108.2	4 24.0	109.2	40
30	6 58.9	105.2	6 55.7	106.2	6 52.5	107.3	6 49.1	108.3	6 45.6	109.3	30
20	9 23.5	105.4	9 19.6	106.4	9 15.7	107.4	9 11.4	108.4	9 07.2	109.4	20
10	11 48.2	105.6	11 43.5	106.6	11 38.7	107.6	11 33.7	108.6	11 28.6	109.6	10
5 00	14 12.5	105.8	14 07.1	106.8	14 01.6	107.8	13 55.8	108.8	13 49.7	109.9	5 00
4 50	16 36.8	106.0	16 30.7	107.0	16 24.3	108.1	16 17.6	109.1	16 10.6	110.2	4 50
40	19 00.8	106.3	18 53.9	107.3	18 46.8	108.4	18 39.1	109.4	18 31.3	110.5	40
30	21 24.7	106.6	21 17.1	107.6	21 09.0	108.7	21 00.6	109.7	20 51.7	110.8	30
20	23 48.3	106.9	23 39.8	108.0	23 30.9	109.1	23 21.4	110.1	23 11.7	111.2	20
10	26 11.7	107.3	26 02.3	108.4	25 52.5	109.5	25 42.1	110.6	25 31.2	111.7	10
4 00	28 34.7	107.7	28.24.5	108.8	28 13.7	110.0	28 02.3	111.1	27 50.4	112.2	4 00
3 50	30 57.4	108.2	30 46.2	109.3	30 34.4	110.5	30 22.0	111.6	30 09.0	112.8	3 50
40	33 19.7	108.8	33 07.4	109.9	32 54.6	111.1	32 41.1	112.2	32 27.0	113.4	40
30	35 41.5	109.4	35 28.3	110.6	35 14.3	111.8	34 59.6	112.9	34 44.3	114.1	30
20	38 02.6	110.0	37 48.3	111.3	37 33.2	112.5	37 17.3	113.7	37 00.8	114.9	20
10	40 23.3	110.8	40 07.7	112.1	39 51.3	113.3	39 25.4	114.6	39 16.4	115.8	10
3 00	42 43.0	111.6	42 26.3	112.9	42 08.7	114.2	41 50.2	115.5	41 30.9	116.8	3 00
2 50	45 02.1	112.6	44 43.9	113.9	44 24.9	115.3	44 04.9	116.6	43 44.1	117.9	2 50
40	47 20.1	113.6	47 00.4	115.0	46 40.0	116.4	46 18.4	117.8	45 56.0	119.1	40
30	49 36.7	114.8	49 15.6	116.3	48 53.5	117.7	48 30.3	119.1	48 06.1	120.5	30
20	51 52.1	116.2	51 29.3	117.7	51 05.4	119.2	50 40.5	120.6	50 14.4	122.0	20
10	54 05.5	117.7	53 41.0	119.3	53 15.4	120.8	52 48.4	122.3	52 20.4	123.8	10
2 00	56 17.5	119.5	55 50.7	121.1	55 22.9	122.7	54 53.8	124.2	54 23.7	125.7	2 00
1 50	58 26.7	121.5	57 57.7	123.2	57 27.6	124.8	56 56.3	126.4	56 23.7	127.9	1 50
40	60 33.0	123.9	60 01.6	125.6	59 29.0	127.3	58 55.1	128.9	58 20.2	130.4	40
30	62 35.5	126.6	62 01.4	128.3	61 26.1	130.1	60 49.5	131.7	60 11.9	133.3	30
20	64 33.4	129.8	63 56.5	131.5	63 18.1	133.3	62 38.7	134.9	61 58.1	136.5	20
10	66 25.7	133.4	65 45.5	135.2	65 04.3	137.0	64 21.4	138.6	63 37.7	140.2	10
1 00	68 10.7	137.7	67 27.0	139.5	66 42.3	141.3	65 56.3	142.9	65 09.6	144.4	1 00
0 50	69 46.7	142.8	68 59.5	144.5	68 11.3	146.2	67 22.0	147.7	66 31.9	149.1	0 50
40	71 11.4	148.7	70 20.3	150.3	69 28.7	151.8	68 36.0	153.1	67 43.3	154.4	40
30	72 21.8	155.4	71 27.5	156.8	70 32.5	158.0	69 37.0	159.1	68 41.2	160.2	30
20	73 15.2	163.0	72 17.8	164.0	71 20.2	164.9	70 22.4	165.7	69 24.5	166.5	20
10	73 48.6	171.3	72 49.3	171.8	71 50.0	172.3	70 50.5	172.7	69 51.0	173.1	10
0 00	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 00.4	110.1	1 58.6	111.1	1 56.6	112.1	1 54.6	113.1	1 52.6	114.1	5 50
40	4 21.2	110.2	4 18.4	111.2	4 15.5	112.2	4 12.5	113.2	4 09.5	114.2	40
30	6 41.9	110.3	6 38.2	111.3	6 34.2	112.3	6 30.3	113.3	6 26.2	114.4	30
20	9 02.6	110.4	8 57.9	111.5	8 53.0	112.5	8 48.0	113.5	8 42.8	114.5	20
10	11 23.0	110.6	11 17.4	111.7	11 11.5	112.7	11 05.5	113.7	10 59.2	114.7	10
5 00	13 43.3	110.9	13 36.7	111.9	13 29.8	112.9	13 22.7	114.0	13 15.4	115.0	5 00
4 50	16 03.4	111.2	15 55.7	112.2	15 47.7	113.2	15 39.6	114.2	15 31.1	115.3	4 50
40	18 23.0	111.5	18 14.4	112.5	18 05.4	113.6	17 56.1	114.6	17 46.6	115.7	40
30	20 42.3	111.9	20 32.7	112.9	20 22.7	114.0	20 12.3	115.0	20 01.5	116.1	30
20	23 01.3	112.3	22 50.7	113.4	22 39.5	114.4	22 27.9	115.4	22 16.0	116.5	20
10	25 19.9	112.8	25 08.1	113.9	24 55.7	114.9	24 43.1	116.0	24 29.8	117.1	10
4 00	27 38.0	113.3	27 25.0	114.4	27 11.5	115.5	26 57.6	116.6	26 43.4	117.7	4 00
3 50	29 55.4	113.9	29 41.3	115.0	29 26.6	116.1	29 11.3	117.2	28 55.5	118.4	3 50
40	32 12.2	114.5	31 56.8	115.7	31 40.8	116.8	31 24.3	118.0	31 07.1	119.1	40
30	34 28.2	115.3	34 11.6	116.5	33 54.2	117.6	33 36.2	118.8	33 17.7	120.0	30
20	36 43.4	116.1	36 25.4	117.3	36 06.5	118.5	35 47.2	119.6	35 27.1	120.8	20
10	38 57.6	117.0	38 38.1	118.2	38 17.9	119.5	37 56.9	120.6	37 35.2	121.9	10
3 00	41 10.6	118.0	40 49.6	119.3	40 27.8	120.5	40 05.3	121.7	39 42.0	122.9	3 00
2 50	43 22.4	119.1	42 59.7	120.4	42 36.3	121.7	42 12.1	122.9	41 47.0	124.1	2 50
40	45 32.5	120.4	45 08.2	121.7	44 43.0	123.0	44 17.0	124.3	43 50.2	125.5	40
30	47 40.9	121.8	47 14.8	123.2	46 47.9	124.5	46 19.9	125.8	45 51.2	127.0	30
20	49 47.3	123.4	49 19.2	124.8	48 50.2	126.1	48 20.3	127.4	47 49.6	128.7	20
10	51 51.1	125.2	51 21.0	126.6	50 50.0	127.9	50 18.0	129.3	49 45.0	130.6	10
2 00	53 52.3	127.2	53 20.0	128.6	52 46.6	130.0	52 12.5	131.3	51 37.3	132.7	2 00
1 50	55 50.1	129.4	55 15.5	130.8	54 39.7	132.3	54 03.1	133.6	53 25.5	135.1	1 50
40	57 43.8	131.9	57 06.7	133.3	56 28.4	134.8	55 49.3	136.2	55 09.4	137.6	40
30	59 32.9	134.8	58 53.0	136.2	58 12.1	137.7	57 30.6	139.0	56 48.1	140.4	30
20	61 16.3	138.0	60 33.7	139.5	59 50.1	140.9	59 05.8	142.2	58 20.7	143.6	20
10	62 53.1	141.7	62 07.6	143.1	61 21.1	144.4	60 34.1	145.7	59 46.2	146.9	10
1 00	64 21.8	145.8	63 33.4	147.1	62 44.1	148.4	61 54.4	149.6	61 03.9	150.7	1 00
0 50	65 41.1	150.4	64 49.9	151 6	63 57.9	152.8	63 15.5	153.9	62 12.5	154.9	0 50
40	66 49.4	155.5	65 55.4	156.6	65 00.8	157.6	64 05.9	158.5	63 10.7	159.4	40
30	67 44.7	161.1	66 48.4	162.0	65 51.7	162.8	64 54.7	163.5	63 57.5	164.2	30
20	68 26.1	167.1	67 27.8	167.8	66 29.2	168.3	65 30.6	168.8	64 31.9	169.3	20
10	68 51.4	173.4	67 51.9	173.8	66 52.3	174.1	65 52.6	174.4	64 52.9	174.6	10
0 00	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 02.1	89.0	0 04.2	88.0	0 06.3	87.0	0 08.4	86.0	6 00
5 50	2 29.9	90.1	2 31.9	89.1	2 33.9	88.1	2 35.9	87.1	2 37.9	86.1	5 50
40	4 59.8	90.2	5 01.8	89.2	5 03.8	88.2	5 05.7	87.2	5 07.5	86.2	40
30	7 29.6	90.3	7 31.7	89.3	7 33.6	88.2	7 35.4	87.2	7 37.1	86.2	30
20	9 59.6	90.4	10 01.7	89.3	10 03.5	88.3	10 05.2	87.3	10 06.6	86.3	20
10	12 29.4	90.4	12 31.7	89.4	12 33.3	88.4	12 34.9	87.4	12 36.2	86.3	10
5 00	14 59.4	90.5	15 01.5	89.5	15 03.2	88.5	15 04.7	87.4	15 05.8	86.4	5 00
4 50	17 29.3	90.6	17 31.4	89.6	17 33.0	88.6	17 34.4	87.5	17 35.4	86.4	4 50
40	19 59.2	90.7	20 01.2	89.7	20 02.9	88 6	20 04.2	87.5	20 05.0	86.5	40
30	22 29.1	90.8	22 31.2	89.7	22 32.8	88.7	22 34.0	87.6	22 34.7	86.5	30
20	24 59.0	90.9	25 01.1	89.8	25 02.6	88.7	24 03.8	87.6	25 04.3	86.5	20
10	27 28.8	91.0	27 31.0	89.9	27 32.5	88.8	27 33.4	87.7	27 34.0	86.5	10
4 00	29 58.8	91.2	30 00.9	90.0	30 02.4	88.8	30 03.3	87.7	30 03.6	86.5	4 00
3 50	32 28.7	91.3	32 30.8	90.1	32 32.2	88.9	32 33.1	87.7	32 33.2	86.5	3 50
40	34 58.5	91.4	35 00.8	90.2	35 02.2	89.0	35 03.0	87.7	35 02.9	86.5	40
30	37 28.4	91.5	37 30.5	90.3	37 32.0	89.0	37 32.7	87.8	37 32.6	86.5	30
20	39 58.2	91.7	40 00.5	90.4	40 02.0	89.0	40 02.5	87 8	40 02.2	86.5	20
10	42 28.0	91.8	42 30.4	90.5	42 31.8	89.1	42 32.2	87.8	42 31.8	86.4	10
3 00	44 57.9	92.0	45 00.4	90.6	45 01.8	89.2	45 02.1	87.8	45 01.4	86.4	3 00
2 50	47 27.7	92.2	47 30.2	90.7	47 31.6	89.2	47 31.9	87.7	47 31.0	86.3	2 50
40	49 57.5	92.4	50 00.2	90.8	50 01.5	89.3	50 01.7	87.7	50 00.5	86.2	40
30	52 27.2	92.6	52 30.0	90.9	52 31.4	89.3	52 31.4	87.7	52 30.1	86.0	30
20	54 57.0	92.8	54 59.9	91.1	55 01.3	89.4	55 01.3	87.6	54 59.6	85.9	20
10	57 26.7	93.1	57 29.6	91.3	57 31.2	89.4	57 31.0	87.6	57 29.1	85.7	10
2 00	59 56.3	93.5	59 59.6	91.5	60 01.2	89.5	60 00.8	59.5	59 58.6	85.5	2 00
1 50	62 26.0	93.8	62 29.5	91.7	62 31.0	89.5	62 30.5	87.3	62 28.0	85.2	1 50
40	64 55.5	94.3	64 59.4	91.9	65 01.0	89.6	65 00.3	87.2	64 57.3	84.8	40
30	67 25.0	94.8	67 29.1	92.2	67 30.8	89.6	67 29.8	87.0	67 26.6	84.4	30
20	69 54.2	95.5	69 58.9	92.6	70 00.8	89.7	69 59.7	86.7	69 55.7	83.8	20
10	72 23.4	96.3	72 28.8	93.0	72 30.6	89.7	72 29.1	86.3	72 26.4	83.1	10
1 00	74 52.2	97.4	74 58.3	93.6	75 00.6	89.7	74 58.9	85.9	74 53.3	82.0	1 00
0 50	77 20.6	99.0	77 28.0	94.4	77 30.5	89.8	77 28.2	85.2	77 21.5	80.6	0 50
40	79 48.2	101.2	79 57.2	95.6	80 00.4	89.8	79 57.6	84.1	79 49.0	78.4	40
30	82 14.3	104.9	82 25.5	97.5	82 30.3	89.9	82 26.0	82.3	82 15.0	74.9	30
20	84 36.8	111.8	84 54.2	101.2	85 00.2	89.9	84 54.4	78.6	84 37.3	68.1	20
10	86 47.0	128.6	87 18.5	111.5	87 30.1	89.9	87 18.6	68.1	86 48.3	51.3	10
0 00	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

25° 038

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 10.4	85.0	0 12.6	84.0	0 14.6	83.0	0 16.7	82.0	0 18.8	81.0	6 00
5 50	2 39.6	85.1	2 41.6	84.1	2 43.4	83.1	2 45.2	82.1	2 46.9	81.1	5 50
40	5 09.1	85.2	5 10.8	84.2	5 12.2	83.2	5 13.6	82.2	5 15.0	81.1	40
30	7 38.4	85.2	7 39.8	84.2	7 41.1	83.2	7 42.1	82.2	7 43.0	81.2	30
20	10 07.9	85.3	10 09.0	84.3	10 09.9	83.3	10 10.7	82.2	10 11.2	81.2	20
10	12 37.3	85.3	12 38.2	84.3	12 38.9	83.3	12 39.2	82.3	12 39.4	81.2	10
5 00	15 06.7	85.4	15 07.3	84.3	15 07.7	83.3	15 07.8	82.3	15 07.5	81.2	5 00
4 50	17 36.2	85.4	17 36.6	84.3	17 36.6	83.3	17 36.3	82.2	17 35.6	81.2	4 50
40	20 05.6	85.4	20 05.7	84.3	20 05.4	83 3	20 04.8	82.2	20 03.8	81.2	40
30	22 35.0	85.4	22 34.9	84.3	22 34.3	83.2	22 33.4	82.2	22 31.9	81.1	30
20	25 04.4	85.4	25 04.0	84.3	25 03.2	83.2	25 01.8	82.1	25 00.0	81.0	20
10	27 33.9	85.4	27 33.2	84.3	27 32.0	83.2	27 30.2	82.0	27 28.0	80.9	10
4 00	30 03.3	85.4	30 02.4	84.2	30 00.8	83.1	29 58.8	81.9	29 56.0	80.8	4 00
3 50	32 32.7	85.3	32 31.6	84.2	32 29.8	83.0	32 27.2	81.8	32 24.0	80.6	3 50
40	35 02.1	85.3	35 00.6	84.1	34 58.4	82.9	34 55.5	81.6	34 51.8	80.4	40
30	37 31.6	85.2	37 29.8	84.0	37 27.1	82.7	37 23.7	81.5	37 19.5	80.2	30
20	40 00.9	85.2	39 58.8	83.9	39 55.8	82.5	39 52.0	81.3	39 47.2	79.9	20
10	42 30.2	85.0	42 27.9	83.7	42 24.4	82.3	42 20.1	81.0	42 14.8	79.6	10
3 00	44 59.6	84.9	44 56.7	83.5	44 53.0	82.1	44 48.1	80.7	44 42.2	79.3	3 00
2 50	47 28.9	84.8	47 25.7	83.3	47 21.4	81.8	47 16.0	80.4	47 09.3	78.9	2 50
40	49 58.2	84.6	49 54.5	83.1	49 49.7	81.5	49 43.7	80.0	49 36.4	78.4	40
30	52 27.4	84.4	52 23.4	82.8	52 18.0	81.1	52 11.2	79.5	52 03.1	77.9	30
20	54 56.5	84.2	54 52.0	82.4	54 46.0	80.7	54 38.5	79.0	54 29.5	77.3	20
10	57 25.6	83.9	57 20.5	82.0	57 13.8	80.2	57 05.4	78.3	56 55.5	76.5	10
2 00	59 54.6	83.5	59 48.8	81.5	59 41.4	79.5	59 32.0	77.6	59 21.0	75.6	2 00
1 50	62 23.5	83.0	62 17.0	80.9	62 08.6	78.8	61 58.2	76.7	61 46.0	74.6	1 50
40	64 52.1	82.5	64 44.8	80.1	64 35.4	77.8	64 23.7	75.6	64 09.9	73.3	40
30	67 20.8	81.8	67 12.2	79.2	67 01.7	76.7	66 48.4	74.2	66 33.0	71.8	30
20	69 48.9	80.9	69 39.4	78.1	69 27.0	75.3	69 12.1	72.5	68 54.5	69.8	20
10	72 16.6	79.8	72 05.6	76.6	71 51.6	73.4	71 34.3	70.4	71 14.0	67.4	10
1 00	74 43.9	78.2	74 30.9	74.6	74 14.2	71.1	73 54.4	67.6	73 31.1	64.3	1 00
0 50	77 10.0	76.2	76 54.5	71.9	76 34.5	67.8	76 11.0	63.8	75 41.7	60.2	0 50
40	79 34.6	73.1	79 15.2	67.9	78 50.9	63.0	78 22.5	58.6	77 49.9	54.6	40
30	81 56.0	68.1	81 31.0	61.6	81 00.5	56.1	80 25.5	51.0	79 45.7	46.6	30
20	84 10.6	58.9	83 36.4	51.1	82 56.3	44.7	82 12.1	39.5	81 24.7	35.2	20
10	86 05.9	39.7	85 17.2	31.9	84 24.8	26.4	83 30.2	22.5	82 34.3	19.5	10
0 00	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 20.8	80.0	0 22.9	79.0	0 24.9	78.0	0 27.0	77.0	0 29.1	76.0	6 00
5 50	2 48.5	80.1	2 50.0	79.1	2 51.6	78.1	2 53.0	77.1	2 54.4	76.1	5 50
40	5 16.1	80.1	5 17.3	79.1	5 18.3	78.1	5 19.2	77.1	5 20.0	76.1	40
30	7 43.8	80.2	7 44.2	79.2	7 44.9	78.2	7 45.3	77.2	7 45.5	76.1	30
20	10 11.5	80.2	10 11.8	79.2	10 11.8	78.2	10 11.5	77.2	10 11.1	76.1	20
10	12 39.2	80.2	12 38.9	79.2	12 38.4	78.1	12 37.6	77.1	12 36.6	76.1	10
5 00	15 07.0	80.2	15 06.2	79.1	15 05.2	78.1	15 03.8	77.1	15 02.1	76.0	5 00
4 50	17 34.7	80.1	17 33.4	79.1	17 31.8	78.1	17 29.7	77.0	17 27.6	75.9	4 50
40	20 02.4	80.1	20 00.7	79.0	19 58.5	78.0	19 55.9	76.9	19 52.9	75.8	40
30	22 29.9	80.0	22 27.7	78.9	22 25.0	77.9	22 21.9	76.8	22 18.3	75.7	30
20	24 57.6	79.9	24 54.9	78.8	24 51.6	77.7	24 47.8	76.6	24 43.4	75.5	20
10	27 25.1	79.8	27 21.8	78.6	27 18.0	77.5	27 13.4	76.4	27 08.5	75.3	10
4 00	29 52.7	79.6	29 48.8	78.5	29 44.3	77.3	29 39.1	76.2	29 33.4	75.0	4 00
3 50	32 20.1	79.4	32 15.6	78.3	32 10.3	77.1	32 04.6	75.9	31 58.3	74.7	3 50
40	34 47.4	79.2	34 42.3	78.0	34 36.5	76.8	34 29.9	75.6	34 22.6	74.4	40
30	37 14.6	79.0	37 08.8	77.7	37 02.3	76.5	36 54.9	75.2	36 46.8	74.0	30
20	39 41.7	78.7	39 35.3	77.4	39 28.0	76.1	39 19.8	74.8	39 10.7	73.5	20
10	42 08.5	78.3	42 01.2	77.0	41 53.1	75.6	41 44.3	74.3	41 34.3	73.0	10
3 00	44 35.2	77.9	44 27.4	76.5	44 18.4	75.1	44 08.4	73.8	43 57.4	72.4	3 00
2 50	47 01.6	77.5	46 52.8	76.0	46 43.0	74.6	46 32.0	73.1	46 20.1	71.7	2 50
40	49 27.9	76.9	49 18.2	75.4	49 07.3	73.9	48 55.2	72.4	48 42.1	70.9	40
30	51 53.7	76.3	51 43.0	74.7	51 31.1	73.1	51 17.7	71.6	51 03.4	70.0	30
20	54 19.1	75.6	54 07.5	73.9	53 54.3	72.2	53 39.6	70.6	53 23.7	69.0	20
10	56 44.0	74.7	56 31.0	72.9	56 16.4	71.2	56 00.5	69.5	55 43.0	67.8	10
2 00	59 08.2	73.7	58 54.1	71.9	58 38.0	70.0	58 20.3	68.2	58 01.1	66.4	2 00
1 50	61 31.8	72.5	61 15.9	70.5	60 58.0	68.6	60 38.8	66.6	60 17.6	64.7	1 50
40	63 54.2	71.1	63 36.6	69.0	63 17.0	66.9	62 55.3	64.8	62 32.0	62.8	40
30	66 15.2	69.4	65 55.3	67.1	65 33.5	64.8	65 09.7	62.6	64 43.9	60.5	30
20	68 34.6	67.2	68 12.5	64.7	67 48.0	62.3	67 21.2	59.9	66 52.5	57.7	20
10	70 51.8	64.6	70 26.0	61.8	69 58.6	59.2	69 28.9	56.7	68 57.0	54.3	10
1 00	73 05.0	61.2	72 36.5	58.2	72 05.0	55.4	71 31.4	52.7	70 55.5	50.2	1 00
0 50	75 13.3	56.7	74 40.1	53.5	74 04.5	50.5	73 26.6	47.7	72 46.6	45.2	0 50
40	77 14.5	50.8	76 36.4	47.4	75 55.2	44.3	75 12.2	41.5	74 27.2	39.0	40
30	79 04.0	42.7	78 19.4	39.3	77 32.3	36.3	76 43.7	33.7	75 53.5	31.3	30
20	80 34.8	31.6	79 43.3	28.6	78 50.4	26.1	77 56.2	24.1	77 01.4	22.1	20
10	81 37.4	17.1	80 39.9	15.3	79 41.8	13.8	78 43.5	12.5	77 44.9	11.5	10
0 00	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 31.0	75.0	0 33.1	74.0	0 35.1	73.0	0 37.1	72.0	0 39.0	71.0	6 00
5 50	2 55.8	75.1	2 57.2	74.1	2 58.3	73.1	2 59.7	72.1	3 00.7	71.1	5 50
40	5 20.7	75.1	5 21.4	74.1	5 21.9	73.1	5 22.3	72.1	5 22.6	71.1	40
30	7 45.6	75.1	7 45.5	74.1	7 45.3	73.1	7 44.9	72.1	7 44.3	71.1	30
20	10 10.5	75.1	10 09.8	74.1	10 08.8	73.1	10 07.6	72.1	10 06.2	71.1	20
10	12 35.3	75.1	12 33.9	74.1	12 32.1	73.0	12 30.2	72.0	12 28.0	71.0	10
5 00	15 00.2	75.0	14 58.1	74.0	14 55.6	72.9	14 52.8	71.9	14 49.7	70.9	5 00
4 50	17 24.9	74.9	17 22.0	73.9	17 18.7	72.8	17 15.1	71.8	17 11.2	70.7	4 50
40	19 49.7	74.8	19 46.1	73.7	19 41.9	72.6	19 37.5	71.6	19 32.6	70.5	40
30	22 14.3	74.6	22 09.7	73.5	22 04.8	72.4	21 59.6	71.4	21 53.9	70.3	30
20	24 38.7	74.4	24 33.6	73.3	24 27.8	72.2	24 21.6	71.1	24 14.9	70.0	20
10	27 03.1	74.2	26 56.9	73.0	26 50.4	71.9	26 43.3	70.8	26 35.7	69.7	10
4 00	29 27.1	73.9	29 20.4	72.7	29 12.8	71.6	29 04.8	70.5	28 56.1	69.3	4 00
3 50	31 51.0	73.6	31 43.3	72.4	31 34.8	71.2	31 25.9	70.1	31 16.2	68.9	3 50
40	34 14.7	73.2	34 06.1	72.0	33 56.7	70.8	33 46.6	69.6	33 35.8	68.4	40
30	36 37.9	72.7	36 28.3	71.5	36 17.9	70.3	36 06.8	69.1	35 55.0	67.8	30
20	39 01.0	72.2	38 50.4	71.0	38 38.9	69.7	38 26.6	68.5	38 13.4	67.2	20
10	41 23.5	71.7	41 11.9	70.4	40 59.1	69.1	40 45.7	67.8	40 31.4	66.5	10
3 00	43 45.6	71.0	43 32.8	69.7	43 18.9	68.4	43 04.1	67.0	42 48.4	65.7	3 00
2 50	46 06.9	70.3	45 52.7	68.9	45 37.7	67.5	45 21.6	66.1	45 04.5	64.8	2 50
40	48 27.9	69.4	48 12.5	68.0	47 55.9	66.6	47 38.2	65.1	47 19.5	63.7	40
30	50 47.7	68.5	50 30.9	67.0	50 12.7	65.5	49 53.7	64.0	49 33.2	62.5	30
20	53 06.6	67.4	52 48.3	65.8	52 28.6	64.2	52 07.5	62.7	51 45.4	61.2	20
10	55 24.3	66.1	55 04.1	64.4	54 42.6	62.8	54 20.0	61.2	53 55.9	59.7	10
2 00	57 40.6	64.6	57 18.7	62.9	56 55.1	61.2	56 30.1	59.5	56 04.0	57.9	2 00
1 50	59 54.9	62.8	59 30.9	61.0	59 05.0	59.3	58 38.0	57.6	58 10.6	55.9	1 50
40	62 07.3	60.8	61 40.9	58.9	61 12.6	57.1	60 43.0	55.3	60 11.9	53.5	40
30	64 16.5	58.4	63 47.4	56.4	63 16.4	54.5	62 44.1	52.6	62 10.5	50.8	30
20	66 22.3	55.5	65 50.2	53.4	65 16.3	51.5	64 40.8	49.5	64 04.0	47.7	20
10	68 23.1	52.1	67 47.7	49.9	67 10.5	47.9	66 31.7	45.9	65 51.7	44.1	10
1 00	70 18.1	47.9	69 38.9	45.7	68 58.0	43.7	68 15.5	41.7	67 32.0	39.8	1 00
0 50	72 04.8	42.8	71 21.5	40.6	70 36.5	38.7	69 50.5	36.7	69 03.0	34.9	0 50
40	73 40.8	36.6	72 52.9	34.6	72 03.9	32.6	71 13.8	30.9	70 22.7	29.3	40
30	75 02.3	29.2	74 10.3	27.4	73 16.5	25.7	72 23.3	24.3	71 28.9	22.9	30
20	76 05.8	20.5	75 09.5	19.1	74 12.9	17.8	73 15.9	16.7	72 18.4	15.7	20
10	76 46.1	10.6	75 47.1	9.9	74 48.0	9.2	73 48.8	8.6	72 49.5	8.0	10
0 00	77 0.0	0.0	76 0.0	0.0	75 0.0	0.0	74 0.0	0.0	73 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 41.0	70.0	0 43.0	69.0	0 44.9	68.0	0 46.8	67.0	0 48.8	66.0	6 00
5 50	3 02.0	70.1	3 03.0	69.1	3 04.0	68.1	3 04.8	67.1	3 05.7	66.1	5 50
40	5 22.9	70.1	5 23.0	69.1	5 23.0	68.1	5 22.9	67.1	5 22.8	66.1	40
30	7 43.7	70.1	7 43.0	69.1	7 42.1	68.0	7 41.0	67.1	7 39.7	66.1	30
20	10 04.8	70.0	10 03.0	69.0	10 01.2	68.0	9 59.0	67.0	9 56.8	66.0	20
10	12 25.6	69.9	12 23.0	68.9	12 20.1	67.9	12 17.0	66.9	12 13.7	65.9	10
5 00	14 46.4	69.8	14 42.8	68.8	14 38.9	67.8	14 34.8	66.7	14 30.3	65.7	5 00
4 50	17 07.0	69.7	17 02.5	68.6	16 57.6	67.6	16 52.4	66.5	16 46.8	65.6	4 50
40	19 27.6	69.5	19 22.0	68.4	19 16.1	67.4	19 09.8	66.3	19 03.2	65.3	40
30	21 47.8	69.3	21 41.2	68.2	21 34.2	67.1	21 26.9	66.0	21 19.1	65.0	30
20	24 07.9	69.0	24 00.2	67.9	23 52.3	66.8	23 43.7	65.7	23 34.8	64.6	20
10	26 27.6	68.6	26 19.0	67.5	26 09.8	66.4	26 00.1	65.3	25 49.9	64.2	10
4 00	28 47.0	68.2	28 37.2	67.1	28 26.9	66.0	28 16.1	64.8	28 04.7	63.7	4 00
3 50	31 05.8	67.7	30 55.0	66.6	30 43.7	65.5	30 31.5	64.3	30 18.8	63.2	3 50
40	33 24.5	67.2	33 12.4	66.1	32 59.7	64.9	32 46.3	63.7	32 32.2	62.6	40
30	35 42.4	66.6	35 29.2	65.5	35 15.1	64.3	35 00.1	63.1	34 44.9	61.8	30
20	37 59.7	66.0	37 45.0	64.8	37 29.7	63.5	37 13.5	62.3	36 56.7	61.0	20
10	40 16.2	65.2	40 00.2	64.0	39 43.5	62.7	39 25.8	61.5	39 07.3	60.2	10
3 00	42 31.9	64.4	42 14.4	63.1	41 56.1	61.8	41 36.9	60.5	41 16.9	59.3	3 00
2 50	44 46.5	63.4	44 27.6	62.1	44 07.6	60.8	43 46.7	59.4	43 25.0	58.2	2 50
40	47 00.0	62.3	46 39.3	61.0	46 17.7	59.6	45 55.0	58.3	45 31.5	57.0	40
30	49 11.9	61.1	48 49.5	59.7	48 26.1	58.3	48 01.7	56.9	47 36.2	55.6	30
20	51 22.3	59.7	50 58.1	58.2	50 32.6	56.8	50 06.1	55.4	49 38.7	54.0	20
10	53 30.7	58.1	53 04.5	56.6	52 36.9	55.1	52 08.3	53.7	51 38.7	52.2	10
2 00	55 36.8	56.3	55 08.2	54.8	54 38.5	53.2	54 07.6	51.8	53 35.8	50.3	2 00
1 50	57 40.0	54.2	57 09.0	52.6	56 37.0	51.1	56 03.7	49.6	55 29.3	48.0	1 50
40	59 39.9	51.8	59 06.3	50.2	58 31.5	48.6	57 55.6	47.1	57 18.8	45.6	40
30	61 35.5	49.1	60 59.1	47.5	60 21.6	45.9	59 43.1	44.3	59 03.3	42.8	30
20	63 26.1	46.0	62 46.8	44.3	62 06.3	42.7	61 24.8	41.2	60 42.3	39.7	20
10	65 10.5	42.3	64 28.0	40.6	63 44.5	39.1	63 00.0	37.6	62 14.5	36.2	10
1 00	66 47.4	38.1	66 01.5	36.5	65 14.8	35.0	64 27.0	33.5	63 38.8	32.2	1 00
0 50	68 15.0	33.3	67 25.7	31.8	66 35.7	30.3	65 45.0	29.0	64 53.7	27.8	0 50
40	69 31.3	27.8	68 38.6	26.4	67 45.6	25.2	66 52.0	24.0	65 57.9	22.9	40
30	70 34.0	21.7	69 38.5	20.5	68 42.7	19.5	67 46.7	18.5	66 50.0	17.6	30
20	71 21.0	14.8	70 23.0	14.0	69 25.0	13.3	68 26.7	12.6	67 28.4	12.0	20
10	71 50.7	7.5	70 50.7	7.1	69 51.2	6.7	68 51.6	6.4	67 51.8	6.1	10
0 00	72 0.0	0.0	71 0.0	0.0	70 0.0	0.0	69 0.0	0.0	68 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 29.9	90.1	2 27.8	91.1	2 25.5	92.1	2 23.4	93.1	2 21.1	94.1	5 50
40	4 59.8	90.2	4 57.6	91.2	4 55.4	92.2	4 53.1	93.2	4 50.7	94.2	40
30	7 29.6	90.3	7 27.5	91.3	7 25.1	92.3	7 22.8	93.3	7 20.1	94.3	30
20	9 59.6	90.4	9 57.4	91.4	9 55.0	92.4	9 52.4	93.4	9 49.6	94.4	20
10	12 29.4	90.4	12 27.2	91.5	12 24.8	92.5	12 22.1	93.5	12 19.0	94.5	10
5 00	14 59.4	90.5	14 57.1	91.6	14 54.5	92.6	14 51.7	93.7	14 48.5	94.7	5 00
4 50	17 29.3	90.6	17 26.9	91.7	17 24.2	92.7	17 21.3	93.8	17 17.9	94.8	4 50
40	19 59.2	90.7	19 56.8	91.8	19 54.0	92.9	19 50.8	93.9	19 47.2	95.0	40
30	22 29.1	90.8	22 26.7	91.9	22 23.7	93.0	22 20.5	94.1	22 16.5	95.2	30
20	24 59.0	90.9	24 56.4	92.0	24 53.4	93.1	24 49.9	94.3	24 45.9	95.3	20
10	27 28.8	91.0	27 26.2	92.2	27 23.1	93.3	27 19.3	94.4	27 15.1	95.5	10
4 00	29 58.8	91.2	29 56.1	92.3	29 52.7	93.5	29 48.8	94.6	29 44.3	95.8	4 00
3 50	32 28.7	91.3	32 25.8	92.5	32 22.2	93.6	32 18.2	94.8	32 13.3	96.0	3 50
40	34 58.5	91.4	34 55.6	92.6	34 51.9	93.8	34 47.6	95.1	34 42.4	96.3	40
30	37 28.4	91.5	37 25.2	92.8	37 21.4	94.0	37 16.9	95.3	37 11.5	96.6	30
20	39 58.2	91.7	39 55.1	93.0	39 51.0	94.3	39 46.1	95.6	39 40.3	96.9	20
10	42 28.0	91.8	42 24.8	93.2	42 20.5	94.5	42 15.3	95.9	42 09.1	97.2	10
3 00	44 57.9	92.0	44 54.4	93.4	44 49.9	94.8	44 44.4	96.2	44 37.8	97.6	3 00
2 50	47 27.7	92.2	47 24.0	93.7	47 19.2	95.1	47 13.4	96.6	47 06.2	98.1	2 50
40	49 57.5	92.4	49 53.7	93.9	49 48.5	95.5	49 42.2	97.0	49 34.5	98.6	40
30	52 27.2	92.6	52 23.1	94.2	52 17.6	95.9	52 10.9	97.5	52 02.8	99.2	30
20	54 57.0	92.8	54 52.6	94.6	54 46.8	96.3	54 39.4	98.0	54 30.6	99.8	20
10	57 26.7	93.1	57 21.9	95.0	57 15.6	96.8	57 07.8	98.6	56 58.1	100.5	10
2 00	59 56.3	93.5	59 51.3	95.5	59 44.4	97.4	59 35.8	99.4	59 25.4	101.3	2 00
1 50	62 26.0	93.8	62 20.4	96.0	62 12.9	98.1	62 03.6	100.2	61 52.0	102.3	1 50
40	64 55.5	94.3	64 49.6	96.6	64 41.3	98.9	64 30.8	101.2	64 18.2	103.5	40
30	67 25.0	94.8	67 18.2	97.4	67 09.0	99.9	66 57.5	102.5	66 43.5	105.0	30
20	69 54.2	95.5	69 46.8	98.4	69 36.5	101.2	69 23.5	104.0	69 07.8	106.7	20
10	72 23.4	96.3	72 14.8	99.6	72 03.6	102.8	71 48.2	105.9	71 30.5	108.9	10
1 00	74 52.2	97.4	74 42.3	101.2	74 28.7	104.9	74 11.5	108.4	73 51.2	111.8	1 00
0 50	77 20.6	99.0	77 08.8	103.4	76 52.5	107.7	76 32.5	111.8	76 08.2	115.7	0 50
40	79 48.2	101.2	79 33.7	106.6	79 13.9	111.7	78 49.4	116.5	78 20.7	121.0	40
30	82 14.3	104.9	81 55.0	111.7	81 29.5	118.0	80 59.5	123.7	80 24.0	128.7	30
20	84 36.8	111.8	84 10.2	120.9	83 35.9	128.6	82 55.8	135.0	82 11.6	140.2	20
10	86 47.9	128.6	86 05.7	140.2	85 17.1	148.0	84 24.6	153.4	83 30.0	157.4	10
0 00	88 0.0	180.0	87 0.0	180.0	86 0.0	180.0	85 0.0	180.0	84 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 18.9	95.1	2 16.5	96.1	2 14.1	97.1	2 11.7	98.1	2 09.2	99.1	5 50
40	4 48.1	95.2	4 45.6	96.2	4 42.9	97.2	4 40.1	98.2	4 37.2	99.2	40
30	7 17.4	95.3	7 14.4	96.3	7 11.5	97.3	7 08.4	98.3	7 05.2	99.3	30
20	9 46.7	95.4	9 43.5	96.4	9 40.3	97.5	9 36.8	98.5	9 33.1	99.5	20
10	12 15.9	95.5	12 12.6	96.5	12 08.9	97.6	12 05.0	98.6	12 00.9	99.7	10
5 00	14 45.1	95.7	14 41.4	96.7	14 37.5	97.8	14 33.2	98.8	14 28.6	99.9	5 00
4 50	17 14.2	95.9	17 10.2	96.9	17 05.9	98.0	17 01.3	99.0	16 56.3	100.1	4 50
40	19 43.3	96.1	19 39.1	97.1	19 34.4	98.2	19 29.4	99.2	19 23.9	100.3	40
30	22 12.4	96.3	22 07.8	97.3	22 02.7	98.4	21 57.2	99.4	21 51.4	100.5	30
20	24 41.4	96.5	24 36.4	97.5	24 31.0	98.6	24 25.1	99.7	24 18.6	100.8	20
10	27 10.3	96.7	27 05.0	97.8	26 59.0	98.9	26 52.6	100.0	26 45.8	101.1	10
4 00	29 39.2	96.9	29 33.5	98.1	29 27.2	99.2	29 20.4	100.3	29 12.8	101.5	4 00
3 50	32 07.9	97.2	32 01.8	98.4	31 55.2	99.5	31 47.7	100.7	31 39.7	101.9	3 50
40	34 36.7	97.5	34 30.1	98.7	34 22.9	99.9	34 14.9	101.1	34 06.3	102.3	40
30	37 05.2	97.8	36 58.2	99.0	36 50.4	100.3	36 41.8	101.5	36 32.5	102.8	30
20	39 33.7	98.2	39 26.2	99.4	39 17.9	100.7	39 08.8	102.0	38 58.7	103.3	20
10	42 02.0	98.6	41 54.0	99.9	41 45.1	101.2	41 35.2	102.6	41 24.4	103.9	10
3 00	44 30.1	99.0	44 21.5	100.4	44 12.0	101.8	44 01.4	103.2	43 49.7	104.5	3 00
2 50	46 58.1	99.5	46 48.9	101.0	46 38.4	102.4	46 27.1	103.9	46 14.6	105.2	2 50
40	49 25.8	100.1	49 15.9	101.6	49 04.8	103.1	48 52.5	104.6	48 39.0	106.0	40
30	51 53.2	100.7	51 42.6	102.3	51 30.6	103.9	51 17.3	105.5	51 02.7	107.0	30
20	54 20.4	101.4	54 08.8	103.1	53 55.9	104.8	53 41.5	106.4	53 25.7	108.0	20
10	56 47.1	102.3	56 34.5	104.1	56 20.2	105.9	56 04.7	107.6	55 47.7	109.3	10
2 00	59 13.3	103.2	58 59.6	105.1	58 44.3	107.0	58 27.2	108.9	58 08.7	110.7	2 00
1 50	61 39.0	104.4	61 23.9	106.4	61 07.0	108.4	60 48.4	110.4	60 28.3	112.3	1 50
40	64 03.7	105.7	63 47.2	107.9	63 28.6	110.1	63 08.2	112.2	62 45.8	114.2	40
30	66 27.5	107.4	66 09.0	109.7	65 48.5	112.1	65 25.8	114.3	65 01.4	116.5	30
20	68 49.7	109.4	68 29.3	112.0	68 06.3	114.5	67 41.3	116.9	67 14.0	119.2	20
10	71 10.0	111.8	70 46.8	114.7	70 21.0	117.4	69 53.0	120.0	69 22.6	122.5	10
1 00	73 27.6	115.1	73 01.2	118.2	72 32.0	121.1	72 00.5	124.0	71 26.4	126.6	1 00
0 50	75 41.0	119.3	75 10.2	122.7	74 36.8	125.9	74 01.0	128.9	73 22.7	131.6	0 50
40	77 48.1	125.0	77 12.2	128.8	76 33.7	132.1	75 52.7	135.2	75 09.4	137.9	40
30	79 44.5	133.1	79 02.5	136.9	78 17.5	140.3	77 30.7	143.3	76 41.7	145.8	30
20	81 23.9	144.5	80 34.3	148.1	79 42.6	151.0	78 49.5	153.5	77 55.4	155.6	20
10	82 34.0	160.3	81 37.2	162.7	80 39.6	164.5	79 41.6	166.1	78 43.3	167.3	10
0 00	83 0.0	180.0	82 0.0	180.0	81 0.0	180.0	80 0.0	180.0	79 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East, and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 06.6	100.1	2 04.2	101.1	2 01.8	102.1	1 58.9	103.1	1 56.4	104.1	5 50
40	4 34.3	100.2	4 31.4	101.2	4 28.2	102.2	4 25.1	103.2	4 21.7	104.2	40
30	7 01.8	100.3	6 58.2	101.3	6 54.8	102.3	6 50.9	103.3	6 47.0	104.3	30
20	9 29.2	100.5	9 25.3	101.5	9 21.2	102.5	9 16.7	103.5	9 12.1	104.5	20
10	11 56.6	100.7	11 52.1	101.7	11 47.4	102.7	11 42.4	103.7	11 37.2	104.7	10
5 00	14 23.9	100.9	14 18.9	101.9	14 13.6	102.9	14 08.0	104.0	14 02.1	105.0	5 00
4 50	16 51.2	101.1	16 45.4	102.1	16 39.6	103.1	16 33.3	104.2	16 26.9	105.2	4 50
40	19 18.1	101.3	19. 12.1	102.4	19 05.6	103.4	18 58.7	104.5	18 51.4	105.5	40
30	21 44.9	101.6	21 38.3	102.7	21 31.2	103.7	21 23.7	104.8	21 15.7	105.8	30
20	24 11.8	101.9	24 04.6	103.0	23 56.8	104.1	23 48.5	105.2	23 39.7	106.2	20
10	26 38.4	102.2	26 30.4	103.3	26 22.1	104.5	26 13.1	105.6	26 03.6	106.6	10
4 00	29 04.8	102.6	28 56.2	103.7	28 47.2	104.9	28 37.3	106.0	28 27.0	107.1	4 00
3 50	31 31.0	103.0	31 21.7	104.2	31 11.8	105.4	31 01.3	106.5	30 50.3	107.6	3 50
40	33 56.9	103.5	33 46.9	104.7	33 36.3	105.9	33 24.9	107.0	33 12.7	108.2	40
30	36 22.5	104.0	36 11.7	105.2	36 00.3	106.5	35 47.9	107.6	35 35.0	108.8	30
20	38 47.9	104.5	38 36.3	105.8	38 23.8	107.1	38 10.6	108.3	37 56.5	109.5	20
10	41 12.8	105.2	41 00.2	106.5	40 46.9	107.8	40 32.6	109.0	40 17.5	110.3	10
3 00	43 37.2	105.9	43 23.8	107.2	43 09.4	108.6	42 54.0	109.9	42 37.6	111.2	3 00
2 50	46 01.1	106.7	45 46.5	108.0	45 31.1	109.5	45 14.5	110.8	44 57.1	112.1	2 50
40	48 24.4	107.5	48 08.8	108.9	47 52.0	110.4	47 34.2	111.8	47 15.3	113.2	40
30	50 47.0	108.6	50 30.1	110.0	50 12.1	111.5	49 52.7	113.0	49 32.5	114.5	30
20	53 08.7	109.7	52 50.5	111.2	52 31.0	112.8	52 10.1	114.3	51 48.1	115.9	20
10	55 29.2	111.0	55 09.4	112.6	54 48.3	114.2	54 25.9	115.8	54 02.1	117.4	10
2 00	57 48.6	112.4	57 27.2	114.2	57 04.3	115.9	56 39.9	117.6	56 14.1	119.2	2 00
1 50	60 06.2	114.2	59 42.9	116.0	59 17.9	117.8	58 51.5	119.6	58 23.9	121.3	1 50
40	62 22.0	116.2	61 56.5	118.1	61 29.3	120.0	61 00.4	121.8	60 30.2	123.6	40
30	64 35.0	118.6	64 07.0	120.6	63 37.3	122.6	63 06.0	124.5	62 33.3	126.3	30
20	66 45.0	121.4	66 14.2	123.6	65 41.6	125.6	65 07.3	127.6	64 31.4	129.5	20
10	68 50.6	124.9	68 16.2	127.1	67 40.7	129.2	67 03.1	131.3	66 24.1	133.2	10
1 00	70 50.4	129.1	70 12.8	131.4	69 33.2	133.5	68 52.1	135.6	68 09.4	137.6	1 00
0 50	72 42.8	134.2	72 00.5	136.5	71 17.0	138.7	70 32.0	140.7	69 45.9	142.6	0 50
40	74 24.3	140.5	73 38.0	142.7	72 50.1	144.9	72 00.9	146.7	71 10.7	148.5	40
30	75 51.7	148.2	75 00.7	150.3	74 08.5	152.2	73 15.3	153.8	72 21.4	155.3	30
20	77 00.5	157.6	76 04.9	159.1	75 08.9	160.6	74 12.0	161.8	73 15.0	162.9	20
10	77 44.7	168.3	76 45.9	169.2	75 46.9	170.0	74 47.6	170.7	73 48.6	171.3	10
0 00	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 53.7	105.1	1 51.0	106.1	1 48.2	107.1	1 45.5	108.1	1 44.6	109.1	5 50
40	4 18.4	105.2	4 18.0	106.2	4 11.5	107.2	4 07.9	108.2	4 04.2	109.2	40
30	6 43.0	105.4	6 36.8	106.4	6 34.6	107.4	6 30.2	108.4	6 25.6	109.4	30
20	9 07.5	105.6	9 02.7	106.6	8 57.6	107.6	8 52.4	108.6	8 47.0	109.6	20
10	11 31.9	105.8	11 26.3	106.8	11 20.4	107.8	11 14.5	108.8	11 08.2	109.8	10
5 00	13 56.1	106.0	13 49.8	107.0	13 43.1	108.1	13 36.2	109.1	13 29.1	110.1	5 00
4 50	16 20.1	106.3	16 12.9	107.3	16 05.5	108.4	15 57.7	109.4	15 49.8	110.4	4 50
40	18 43.8	106.6	18 36.0	107.6	18 27.7	108.7	18 19.1	109.7	18 10.1	110.8	40
30	21 07.4	106.9	20 58.7	108.0	20 49.4	109.1	20 30.0	110.1	20 30.1	111.2	30
20	23 30.7	107.3	23 21.2	108.4	23 11.1	109.5	23 00.6	110.5	22 49.7	111.6	20
10	25 53.7	107.7	25 43.2	108.8	25 32.3	109.9	25 20.7	111.0	25 08.9	112.1	10
4 00	28 16.2	108.2	28 04.9	109.3	27 53.0	110.5	27 40.5	111.6	27 27.5	112.7	4 00
3 50	30 38.4	108.8	30 26.0	109.9	30 13.1	111.1	29 59.7	112.2	29 45.5	113.3	3 50
40	33 00.0	109.4	32 46.8	110.5	32 32.8	111.7	32 18.1	112.8	32 02.8	114.0	40
30	35 21.3	110.0	35 06.8	111.2	34 51.7	112.4	34 36.0	113.6	34 19.5	114.7	30
20	37 41.8	110.8	37 26.3	112.0	37 09.9	113.2	36 52.9	114.4	36 35.1	115.6	20
10	40 01.7	111.6	39 44.9	112.9	39 27.3	114.1	39 09.0	115.3	38 49.9	116.5	10
3 00	42 20.5	112.5	42 02.6	113.8	41 43.7	115.0	41 23.9	116.3	41 03.4	117.5	3 00
2 50	44 38.5	113.5	44 19.2	114.8	43 58.9	116.1	43 37.3	117.5	43 15.7	118.7	2 50
40	46 55.5	114.6	46 34.8	116.0	46 12.8	117.3	45 50.0	118.7	45 26.3	120.0	40
30	49 11.1	115.9	48 48.7	117.3	48 25.1	118.7	48 00.7	120.1	47 35.2	121.4	30
20	51 25.1	117.3	51 01.1	118.8	50 35.8	120.2	50 09.3	121.6	49 42.0	123.0	20
10	53 37.3	119.0	53 11.3	120.5	52 44.1	122.0	52 16.0	123.4	51 46.6	124.8	10
2 00	55 47.3	120.8	55 19.4	122.4	54 50.0	123.9	54 19.5	125.4	53 48.0	126.8	2 00
1 50	57 54.6	122.9	57 24.4	124.5	56 52.7	126.1	56 20.1	127.6	55 46.2	129.1	1 50
40	59 58.9	125.3	59 26.3	127.0	58 52.1	128.6	58 16.9	130.1	57 40.5	131.7	40
30	61 59.0	128.1	61 23.7	129.8	60 46.9	131.4	60 09.0	133.0	59 30.2	134.6	30
20	63 54.5	131.3	63 16.2	133.0	62 36.6	134.7	61 55.7	136.3	61 14.0	137.8	20
10	65 43.7	135.0	65 02.4	136.8	64 19.7	138.4	63 35.9	140.0	62 51.2	141.5	10
1 00	67 25.8	139.4	66 41.1	141.1	65 55.1	142.7	65 08.1	144.2	64 20.3	145.6	1 00
0 50	69 17.7	144.4	68 10.3	146.0	67 21.0	147.5	66 31.0	148.9	65 40.1	150.2	0 50
40	70 19.7	150.1	69 27.9	151.6	68 35.5	153.0	67 42.3	154.2	66 48.6	155.4	40
30	71 27.0	156.7	70 32.0	157.9	69 36.5	159.0	68 40.7	160.0	67 44.6	161.0	30
20	72 17.6	163.9	71 20.2	164.8	70 22.2	165.6	69 24.2	166.4	68 25.9	167.1	20
10	72 49.3	171.8	71 49.9	172.3	70 50.4	172.7	69 50.9	173.1	68 51.4	173.4	10
0 00	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 39.7	110.1	1 37.0	111.1	1 34.0	112.1	1 31.0	113.1	1 28.1	114.1	5 50
40	4 00.5	110.2	3 56.7	111.2	3 52.9	112.2	3 48.8	113.2	3 44.9	114.2	40
30	6 21.1	110.4	6 16.4	111.4	6 11.5	112.4	6 06.5	113.4	6 01.5	114.4	30
20	8 41.6	110.6	8 35.8	111.6	8 30.1	112.6	8 24.1	113.6	8 17.9	114.6	20
10	11 01.7	110.8	10 55.2	111.8	10 48.2	112.8	10 41.2	113.8	10 34.1	114.8	10
5 00	13 21.8	111.1	13 14.2	112.1	13 06.4	113.1	12 58.3	114.2	12 49.9	115.2	5 00
4 50	15 41.4	111.4	15 32.8	112.5	15 24.0	113.5	15 14.8	114.5	15 05.4	115.5	4 50
40	18 00.9	111.8	17 51.2	112.9	17 41.3	113.9	17 31.0	114.9	17 20.5	115.9	40
30	20 19.8	112.2	20 09.1	113.3	19 58.1	114.3	19 46.7	115.3	19 35.0	116.4	30
20	22 38.4	112.7	22 26.6	113.8	22 14.6	114.8	22 02.0	115.8	21 49.0	116.9	20
10	24 56.4	113.2	24 43.7	114.3	24 30.3	115.3	24 16.5	116.4	24 02.3	117.4	10
4 00	27 14.0	113.8	27 00.0	114.9	26 45.5	115.9	26 30.5	117.0	26 15.0	118.1	4 00
3 50	29 30.7	114.4	29 15.6	115.5	28 59.1	116.6	28 43.6	117.7	28 26.8	118.8	3 50
40	31 47.0	115.1	31 30.5	116.2	31 13.5	117.4	30 55.9	118.5	30 37.7	119.6	40
30	34 02.3	115.9	33 44.7	117.0	33 26.1	118.2	33 07.2	119.3	32 47.6	120.5	30
20	36 16.7	116.8	35 57.5	117.9	35 37.8	119.1	35 17.2	120.2	34 56.1	121.4	20
10	38 30.0	117.8	38 09.4	118.9	37 48.1	120.1	37 26.1	121.3	37 03.4	122.5	10
3 00	40 42.1	118.8	40 19.9	120.0	39 57.2	121.2	39 33.5	122.4	39 09.1	123.6	3 00
2 50	42 52.7	120.0	42 29.0	121.2	42 04.4	122.4	41 39.1	123.7	41 13.1	124.9	2 50
40	45 01.8	121.3	44 36.3	122.6	44 10.1	123.8	43 42.8	125.1	43 14.9	126.3	40
30	47 08.8	122.8	46 41.5	124.1	46 13.3	125.3	45 44.5	126.6	45 14.7	127.9	30
20	49 13.8	124.4	48 44.6	125.7	48 14.5	127.0	47 43.5	128.3	47 11.6	129.6	20
10	51 16.2	126.2	50 45.0	127.6	50 12.7	128.9	49 39.6	130.2	49 05.8	131.6	10
2 00	53 15.7	128.2	52 42.1	129.6	52 07.8	131.0	51 32.4	132.3	50 56.3	133.6	2 00
1 50	55 11.6	130.5	54 35.7	131.9	53 59.0	133.3	53 21.3	134.6	52 43.0	135.9	1 50
40	57 03.4	133.1	56 25.0	134.5	55 45.9	135.9	55 05.7	137.2	54 24.8	138.5	40
30	58 50.2	136.0	58 09.3	137.4	57 27.5	138.7	56 45.0	140.0	56 01.6	141.3	30
20	60 31.4	139.2	59 47.7	140.6	59 03.3	141.9	58 18.1	143.2	57 32.1	144.4	20
10	62 05.6	142.8	61 19.2	144.2	60 32.0	145.5	59 44.2	146.7	58 55.7	147.9	10
1 00	63 32.0	146.9	62 42.6	148.2	61 52.9	149.4	61 02.3	150.5	60 11.4	151.6	1 00
0 50	64 48.7	151.4	63 56.7	152.6	63 04.2	153.7	62 11.2	154.7	61 18.1	155.7	0 50
40	65 54.7	156.4	65 00.0	157.5	64 05.3	158.4	63 10.0	159.3	62 14.4	160.1	40
30	66 44.0	161.9	65 51.3	162.7	64 54.3	163.4	63 57.2	164.1	62 59.7	164.8	30
20	67 27.6	167.7	66 29.0	168.2	65 30.5	168.8	64 31.7	169.3	63 32.9	169.7	20
10	67 51.8	173.8	66 52.2	174.1	65 51.6	174.3	64 52.9	174.6	63 53.5	174.8	10
0 00	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 03.1	89.0	0 06.3	88.0	0 09.4	87.0	0 12.6	86.0	6 00
5 50	2 29.8	90.1	2 33.0	89.1	2 35.9	88.1	2 39.1	87.1	2 42.1	86.1	5 50
40	4 59.6	90.3	5 02.7	89.3	5 05.7	88.3	5 08.7	87.3	5 11.5	86.3	40
30	7 29.4	90.4	7 32.6	89.4	7 35.4	88.4	7 38.3	87.4	7 40.9	86.4	30
20	9 59.2	90.5	10 02.2	89.5	10 05.2	88.5	10 07.9	87.5	10 10.4	86.5	20
10	12 29.4	90.7	12 32.1	89.6	12 34.9	88.7	12 37.6	87.6	12 40.0	86.6	10
5 00	14 58.7	90.8	15 01.8	89.8	15 04.7	88.7	15 07.2	87.7	15 09.5	86.7	5 00
4 50	17 28.6	90.9	17 31.7	89.9	17 34.4	88.8	17 37.0	87.8	17 39.0	86.8	4 50
40	19 58.3	91.1	20 01.4	90.0	20 04.2	89.0	20 06.6	87.9	20 08.6	86.9	40
30	22 28.0	91.2	22 31.3	90.2	22 34.0	89.1	22 36.4	88.0	22 38.2	86.9	30
20	24 57.8	91.4	25 01.0	90.3	25 03.8	89.2	25 06.0	88.1	25 07.7	87.0	20
10	27 27.6	91.6	27 30.8	90.5	27 33.4	89.3	27 35.8	88.2	27 37.3	87.1	10
4 00	29 57.3	91.7	30 00.6	90.6	30 03.3	89.4	30 05.4	88.3	30 06.9	87.1	4 00
3 50	32 27.0	91.9	32 30.5	90.7	32 33.1	89.5	32 35.2	88.4	32 36.6	87.2	3 50
40	34 56.7	92.1	35 00.1	90.9	35 03.0	89.7	35 04.8	88.4	35 06.2	87.2	40
30	37 26.4	92.3	37 30.1	91.0	37 32.7	89.8	37 34.7	88.5	37 35.8	87.3	30
20	39 56.0	92.5	39 59.7	91.2	40 02.5	89.9	40 04.5	88.6	40 05.4	87.3	20
10	42 25.7	92.8	42 29.6	91.4	42 32.2	90.0	42 34.2	88.7	42 35.0	87.3	10
3 00	44 55.3	93.0	44 59.2	91.6	45 02.1	90.2	45 04.0	88.8	45 04.7	87.4	3 00
2 50	47 24.9	93.3	47 29.0	91.8	47 31.8	90.3	47 33.7	88.8	47 34.3	87.4	2 50
40	49 54.4	93.6	49 58.6	92.0	50 01.7	90.5	50 03.4	88.9	50 04.0	87.4	40
30	52 23.9	93.9	52 28.4	92.2	52 31.4	90.6	52 33.2	89.0	52 33.5	87.3	30
20	54 53.3	94.3	54 58.0	92.5	55 01.3	90.8	55 03.0	89.1	55 03.2	87.3	20
10	57 22.6	94.7	57 27.6	92.8	57 31.0	91.0	57 32.8	89.1	57 32.9	87.3	10
2 00	59 51.9	95.2	59 57.2	93.2	60 00.8	91.2	60 02.5	89.2	60 02.4	87.2	2 00
1 50	62 21.0	95.8	62 26.8	93.6	62 30.5	91.4	62 32.3	89.3	62 32.0	87.1	1 50
40	64 50.0	96.4	64 56.2	94.1	65 00.3	91.7	65 02.1	89.3	65 01.7	87.0	40
30	67 18.7	97.2	67 25.8	94.6	67 29.8	92.0	67 31.9	89.4	67 31.0	86.8	30
20	69 47.1	98.2	69 54.9	95.3	69 59.7	92.4	70 01.6	89.5	70 00.8	86.6	20
10	72 15.2	99.4	72 23.9	96.1	72 29.1	92.9	72 31.5	89.5	72 30.2	86.2	10
1 00	74 42.6	101.0	74 52.6	97.3	74 58.9	93.5	75 01.3	89.6	74 59.8	85.7	1 00
0 50	77 09.0	103.3	77 21.0	98.9	77 28.2	94.3	77 31.1	89.7	77 29.0	85.1	0 50
40	79 33.8	106.5	79 48.5	101.1	79 57.6	95.5	80 00.8	89.7	79 58.1	84.0	40
30	81 55.5	111.7	82 15.0	104.8	82 26.0	97.4	82 30.6	89.8	82 26.5	82.2	30
20	84 10.2	120.9	84 37.1	111.7	84 54.4	101.2	85 00.4	89.9	84 54.6	78.5	20
10	86 05.7	140.2	86 47.9	128.6	87 18.7	111.8	87 30.2	89.9	87 18.7	68.1	10
0 00	87 0.0	180.0	88 0.0	180.0	89 0 0	180.0	90 0.0	Ind.	89 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		8°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 15.6	85.0	0 18.8	84.0	0 21.9	83.0	0 25.0	82.0	0 28.2	81.0	6 00
5 50	2 45.0	85.1	2 47.8	84.1	2 50.5	83.1	2 53.5	82.1	2 56.2	81.1	5 50
40	5 14.2	85.3	5 16.8	84.3	5 19.4	83.3	5 21.8	82.3	5 24.1	81.2	40
30	7 43.6	85.4	7 45.9	84.4	7 48.1	83.3	7 50.3	82.3	7 52.2	81.3	30
20	10 12.7	85.5	10 15.0	84.4	10 16.9	83.4	10 18.7	82.4	10 20.3	81.4	20
10	12 42.2	85.6	12 44.1	84.5	12 45.7	83.5	12 47.3	82.5	12 48.4	81.4	10
5 00	15 11.4	85.6	15 13.1	84.6	15 14.6	83.6	15 15.7	82.5	15 16.5	81.5	5 00
4 50	17 40.9	85.7	17 42.3	84.7	17 43.5	83.6	17 44.3	82.6	17 44.7	81.5	4 50
40	20 10.2	85.8	20 11.4	84.7	20 12.3	83.7	20 12.7	82.6	20 12.8	81.5	40
30	22 39.7	85.8	22 40.6	84.8	22 41.1	83.7	22 41.3	82.6	22 41.1	81.5	30
20	25 09.0	84.9	25 09.8	84.8	25 10.0	83.7	25 09.8	82.6	25 09.1	81.5	20
10	27 38.4	85.9	27 39.0	84.8	27 39.0	83.7	27 38.5	82.6	27 37.1	81.4	10
4 00	30 07.8	86.0	30 08.1	84.8	30 07.9	83.7	30 06.8	82.5	30 05.3	81.3	4 00
3 50	32 37.3	86.0	32 37.3	84.8	32 36.7	83.6	32 35.5	82.4	32 33.4	81.2	3 50
40	35 06.7	86.0	35 06.5	84.8	35 05.6	83.5	35 03.8	82.3	35 01.4	81.1	40
30	37 36.2	86.0	37 35.7	84.7	37 34.4	83.5	37 32.4	82.2	37 29.5	81.0	30
20	40 05.5	86.0	40 04.8	84.7	40 03.2	83.4	40 00.6	82.1	39 57.3	80.8	20
10	42 35.1	86.0	42 34.0	84.6	42 32.0	83.2	42 29.1	81.9	42 25.1	80.5	10
3 00	45 04.3	85.9	45 03.1	84.5	45 00.7	83.1	44 57.2	81.7	44 52.8	80.3	3 00
2 50	47 33.9	85.9	47 32.1	84.4	47 29.3	82.9	47 25.5	81.4	47 20.5	80.0	2 50
40	50 03.1	85.8	50 01.2	84.2	49 58.1	82.7	49 53.5	81.1	49 47.8	79.6	40
30	52 32.6	85.7	52 30.1	84.0	52 26.4	82.4	52 21.4	80.8	52 12.1	79.2	30
20	55 01.9	85.6	54 59.2	83.8	54 55.0	82.1	54 49.2	80.4	54 42.0	78.6	20
10	57 31.5	85.4	57 28.0	83.5	57 23.2	81.7	57 16.8	79.9	57 08.8	78.0	10
2 00	60 00.5	85.2	59 56.9	83.2	59 51.4	81.2	59 44.1	79.3	59 35.0	77.3	2 00
1 50	62 30.0	84.9	62 25.5	82.8	62 19.4	80.6	62 11.2	78.5	62 01.0	76.4	1 50
40	64 59.6	84.6	64 54.2	82.3	64 47.0	79.9	64 37.5	77.6	64 26.2	75.3	40
30	67 28.0	84.2	67 22.2	81.6	67 14.2	79.0	67 03.8	76.5	66 50.7	74.0	30
20	69 57.0	83.6	69 50.5	80.7	69 41.1	77.9	69 28.7	75.1	69 14.0	72.3	20
10	72 26.0	82.9	72 18.0	79.6	72 07.0	76.4	71 53.2	73.2	71 35.8	70.2	10
1 00	74 54.2	81.9	74 45.0	78.1	74 32.0	74.4	74 15.6	70.9	73 55.6	67.4	1 00
0 50	77 22.5	80.5	77 11.0	76.0	76 55.3	71.7	76 35.5	67.6	76 12.0	63.6	0 50
40	79 49.6	78.3	79 35.4	72.9	79 16.0	67.7	78 51.8	62.9	78 23.4	58.4	40
30	82 15.5	74.8	81 56.5	67.9	81 31.5	61.6	81 01.0	55.9	80 25.7	50.8	30
20	84 37.6	68.0	84 10.9	58.8	83 36.7	51.1	82 56.7	44.6	82 12.5	39.4	20
10	86 48.2	51.2	86 06.0	39.6	85 17.3	31.8	84 24.9	26.4	83 30.3	22.4	10
0 00	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 31.2	80.0	0 34.3	79.0	0 37.4	78.0	0 40.5	77.0	0 43.6	76.0	6 00
5 50	2 58.8	80.1	3 01.4	79.1	3 04.0	78.1	3 06.5	77.1	3 08.9	76.1	5 50
40	5 26.4	80.2	5 28.6	79.2	5 30.6	78.2	5 32.5	77.2	5 34.3	76.2	40
30	7 54.1	80.3	7 55.5	79.3	7 57.3	78.3	7 58.7	77.3	7 59.9	76.3	30
20	10 21.7	80.4	10 22.9	79.4	10 23.9	78.3	10 24.8	77.3	10 25.4	76.3	20
10	12 49.4	80.4	12 50.1	79.4	12 50.6	78.4	12 50.9	77.3	12 51.0	76.3	10
5 00	15 17.1	80.5	15 17.4	79.4	15 17.4	78.4	15 17.1	77.4	15 16.5	76.3	5 00
4 50	17 44.8	80.5	17 44.6	79.4	17 44.2	78.4	17 43.4	77.3	17 41.9	76.3	4 50
40	20 12.6	80.5	20 11.9	79.4	20 10.8	78.3	20 09.3	77.3	20 07.4	76.2	40
30	22 40.4	80.4	22 39.1	79.3	22 37.5	78.3	22 35.4	77.2	22 33.0	76.1	30
20	25 08.0	80.4	25 06.3	79.3	25 04.1	78.2	25 01.4	77.1	24 58.2	76.0	20
10	27 35.6	80.3	27 33.4	79.2	27 30.7	78.0	27 27.3	76.9	27 23.5	75.8	10
4 00	30 03.2	80.2	30 00.5	79.0	29 57.2	77.9	29 53.3	76.7	29 48.6	75.6	4 00
3 50	32 30.8	80.0	32 27.5	78.9	32 23.6	77.7	32 19.0	76.5	32 13.7	75.3	3 50
40	34 58.3	79.9	34 54.5	78.7	34 49.9	77.5	34 44.5	76.2	34 38.4	75.0	40
30	37 25.6	79.7	37 21.3	78.4	37 16.0	77.2	37 09.0	75.9	37 03.2	74.7	30
20	39 53.1	79.5	39 47.9	78.2	39 42.0	76.9	39 35.1	75.6	39 27.4	74.3	20
10	42 20.2	79.2	42 14.5	77.9	42 07.7	76.5	42 00.2	75.2	41 51.4	73.8	10
3 00	44 47.4	78.9	44 40.8	77.5	44 33.3	76.1	44 24.7	74.7	44 15.2	73.3	3 00
2 50	47 14.3	78.5	47 06.9	77.0	46 58.5	75.6	46 49.0	74.1	46 39.4	72.7	2 50
40	49 40.9	78.1	49 32.8	76.5	49 23.4	75.0	49 12.9	73.5	49 01.1	72.0	40
30	52 07.3	77.5	51 58.4	75.9	51 47.9	74.3	51 36.3	72.8	51 23.4	71.2	30
20	54 33.5	76.9	54 23.4	75.2	54 11.9	73.6	53 59.0	71.9	53 44.6	70.2	20
10	56 59.0	76.2	56 47.9	74.4	56 35.1	72.6	56 20.9	70.9	56 05.1	69.1	10
2 00	59 24.4	75.4	59 11.9	73.4	58 57.8	71.5	58 41.8	69.7	58 24.5	67.8	2 00
1 50	61 48.9	74.3	61 34.9	72.3	61 19.3	70.3	61 01.7	68.3	60 42.5	66.3	1 50
40	64 12.6	73.1	63 57.2	70.8	63 39.6	68.7	63 20.1	66.6	62 58.7	64.5	40
30	66 35.3	71.5	66 17.8	69.1	65 58.3	66.8	65 36.5	64.5	65 12.7	62.3	30
20	68 56.7	69.6	67 37.0	67.0	68 14.8	64.5	67 50.3	62.1	67 23.7	59.7	20
10	71 16.0	67.2	70 53.5	64.4	70 26.2	61.6	70 00.7	59.0	69 30.9	56.5	10
1 00	73 32.6	64.1	73 06.7	61.0	72 37.9	58.0	72 06.6	55.2	71 33.0	52.5	1 00
0 50	75 45.0	60.0	75 14.7	56.5	74 41.5	53.3	74 06.0	50.3	73 28.0	47.6	0 50
40	77 51.0	54.4	77 15.6	50.6	76 37.1	47.2	75 56.1	44.1	75 13.0	41.3	40
30	79 47.0	46.4	79 04.5	42.5	78 19.7	39.1	77 33.0	36.1	76 44.0	33.5	30
20	81 25.0	35.1	80 35.2	31.6	79 43.6	28.5	78 50.7	26.0	77 56.6	23.9	20
10	82 34.4	19.4	81 37.5	17.1	80 39.9	15.3	79 41.9	13.8	78 43.6	12.5	10
0 00	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 46.6	75.0	0 49.6	74.0	0 52.7	73.0	0 55.6	72.0	0 58.5	71.0	6 00
5 50	3 11.4	75.1	3 13.7	74.1	3 15.9	73.1	3 18.1	72.1	3 20.3	71.1	5 50
40	5 36.1	75.2	5 37.7	74.2	5 39.3	73.2	5 40.7	72.2	5 42.0	71.2	40
30	8 01.0	75.3	8 01.9	74.3	8 02.7	73.2	8 03.3	72.2	8.03.8	71.2	30
20	10 25.9	75.3	10 26.1	74.3	10 26.2	73.3	10 26.0	72.3	10 25.6	71.2	20
10	12 50.8	75.3	12 50.3	74.3	12 49.7	73.2	12 48.7	72.2	12 47.5	71.2	10
5 00	15 15.6	75.3	15 14.5	74.2	15 13.0	73.2	15 11.3	72.2	15 09.2	71.1	5 00
4 50	17 40.5	75.2	17 38.6	74.2	17 36.3	73.1	17 33.9	72.1	17 31.0	71.0	4 50
40	20 05.3	75.1	20 02.7	74.1	19 59.7	73.0	19 56.3	71.9	19 52.5	70.9	40
30	22 30.0	75.0	22 26.6	73.9	22 22.8	72.8	22 18.4	71.8	22 14.0	70.7	30
20	24 54.7	74.8	24 50.5	73.8	24 46.0	72.6	24 40.9	71.6	24 35.2	70.5	20
10	27 19.1	74.6	27 14.2	73.6	27 08.7	72.4	27 02.8	71.3	26 56.3	70.2	10
4 00	29 43.5	74.4	29 37.8	73.3	29 31.5	72.1	29 24.6	71.0	29 17.0	69.9	4 00
3 50	32 07.8	74.1	32 01.2	73.0	31 53.9	71.8	31 46.1	70.6	31 37.5	69.5	3 50
40	34 31.7	73.8	34 24.3	72.6	34 16.1	71.4	34 07.2	70.2	33 57.6	69.0	40
30	36 55.5	73.5	36 47.0	72.2	36 37.9	71.0	36 27.9	69.7	36 17.2	68.5	30
20	39 18.9	73.0	39 09.5	71.8	38 59.4	70.5	38 48.2	69.2	38 36.3	68.0	20
10	41 41.9	72.5	41 31.5	71.2	41 20.3	69.9	41 08.0	68.6	40 55.0	67.3	10
3 00	44 04.6	71.9	43 53.1	70.6	43 40.7	69.2	43 27.1	67.9	43 12.6	66.5	3 00
2 50	46 26.8	71.3	46 14.0	69.9	46 00.3	68.4	45 45.5	67.0	45 29.7	65.7	2 50
40	48 48.4	70.5	48 34.3	69.1	48 19.3	67.6	48 03.0	66.1	47 45.6	64.7	40
30	51 09.0	69.6	50 53.4	68.1	50 37.2	66.6	50 20.3	65.1	50 00.5	63.6	30
20	53 29.2	68.6	53 12.3	67.0	52 54.1	65.4	52 34.5	63.9	52 13.8	62.3	20
10	55 48.0	67.4	55 29.3	65.7	55 09.4	64.1	54 48.3	62.5	54 25.6	60.9	10
2 00	58 05.7	66.0	57 45.3	64.3	57 23.5	62.5	57 00.1	60.8	56 35.3	59.2	2 00
1 50	60 21.5	64.4	59 59.1	62.5	59 35.3	60.7	59 09.6	59.0	58 42.6	57.2	1 50
40	62 35.7	62.5	62 10.9	60.5	61 44.7	58.6	61 16.4	56.8	60 47.0	55.0	40
30	64 47.1	60.2	64 19.8	58.1	63 50.7	56.1	63 19.9	54.2	62 47.7	52.3	30
20	66 55.4	57.5	66 24.9	55.3	65 53.0	53.2	65 19.2	51.2	64 43.7	49.3	20
10	68 59.3	54.1	68 25.5	51.8	67 50.0	49.7	67 12.9	47.6	66 34.2	45.7	10
1 00	70 57.6	50.0	70 20.0	47.7	69 40.8	45.5	68 59.8	43.4	68 17.4	41.4	1 00
0 50	72 48.0	45.0	72 06.0	42.6	71 22.7	40.4	70 37.7	38.5	69 51.9	36.5	0 50
40	74 28.4	38.8	73 41.8	36.5	72 53.9	34.4	72 04.9	32.5	71 14.7	30.7	40
30	75 54.0	31.2	75 02.8	29.1	74 11.0	27.3	73 17.7	25.5	72 23.9	24.1	30
20	77 01.9	22.0	76 06.1	20.5	75 09.8	19.0	74 13.2	17.7	73 16.1	16.6	20
10	77 45.0	11.5	76 46.2	10.6	75 47.2	9.8	74 48.1	9.1	73 48.9	8.5	10
0 00	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	75 0.0	0.0	74 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 01. 5	70. 0	1 04. 5	69. 0	1 07. 4	68. 0	1 10. 3	67. 0	1 13. 2	66. 0	6 00
5 50	3 22. 3	70. 1	3 24. 4	69. 1	3 26. 4	68. 1	3 28. 3	67. 1	3 30. 2	66. 1	5 50
40	5 43. 2	70. 2	5 44. 4	69. 2	5 45. 3	68. 2	5 46. 3	67. 2	5 47. 1	66. 2	40
30	8 04. 2	70. 2	8 04. 5	69. 2	8 04. 4	68. 2	8 04. 4	67. 2	8 04. 2	66. 2	30
20	10 25. 1	70. 2	10 24. 5	69. 2	10 23. 5	68. 2	10 22. 5	67. 2	10 21. 1	66. 2	20
10	12 46. 1	70. 2	12 44. 5	69. 2	12 42. 6	68. 1	12 40. 5	67. 1	12 38. 2	66. 1	10
5 00	15 06. 9	70. 1	15 04. 4	69. 1	15 01. 5	68. 0	14 58. 4	67. 0	14 55. 0	65. 9	5 00
4 50	17 27. 7	70. 0	17 24. 2	68. 9	17 20. 3	67. 9	17 16. 2	66. 8	17 11. 7	65. 8	4 50
40	19 48. 4	69. 8	19 43. 9	68. 7	19 39. 0	67. 7	19 33. 8	66. 6	19 28. 2	65. 6	40
30	22 08. 8	69. 6	22 03. 4	68. 5	21 57. 4	67. 5	21 51. 2	66. 4	21 44. 4	65. 3	30
20	24 29. 1	69. 4	24 22. 7	68. 3	24 15. 7	67. 2	24 08. 3	66. 1	24 00. 4	65. 0	20
10	26 49. 2	69. 1	26 41. 7	68. 0	26 33. 6	66. 9	26 25. 0	65. 7	26 16. 0	64. 6	10
4 00	29 09. 0	68. 7	29 00. 4	67. 6	28 51. 2	66. 5	28 41. 4	65. 3	28 31. 1	64. 2	4 00
3 50	31 28. 3	68. 3	31 18. 7	67. 2	31 08. 2	66. 0	30 57. 2	64. 9	30 45. 7	63. 7	3 50
40	33 47. 3	67. 9	33 36. 4	66. 7	33 24. 8	65. 5	33 12. 6	64. 3	32 59. 6	63. 1	40
30	36 05. 8	67. 3	35 53. 7	66. 1	35 40. 8	64. 9	35 27. 2	63. 7	35 13. 0	62. 5	30
20	38 23. 7	66. 7	38 10. 4	65. 5	37 56. 1	64. 2	37 41. 2	63. 0	37 25. 4	61. 8	20
10	40 41. 0	66. 0	40 26. 2	64. 7	40 10. 7	63. 4	39 54. 2	62. 2	39 36. 9	60. 9	10
3 00	42 57. 4	65. 2	42 41. 3	63. 9	42 24. 1	62. 6	42 06. 1	61. 3	41 47. 2	60. 0	3 00
2 50	45 12. 9	64. 3	44 55. 1	63. 0	44 36. 5	61. 6	44 17. 0	60. 3	43 56. 4	58. 9	2 50
40	47 27. 3	63. 3	47 08. 1	61. 9	46 47. 6	60. 5	46 26. 2	59. 1	46 03. 9	57. 8	40
30	49 40. 5	62. 1	49 19. 4	60. 7	48 57. 2	59. 3	48 35. 1	57. 8	48 09. 9	56. 4	30
20	51 52. 0	60. 8	51 29. 2	59. 3	51 05. 1	57. 9	50 39. 8	56. 4	50 13. 6	55. 0	20
10	54 01. 9	59. 3	53 36. 9	57. 7	53 10. 7	56. 2	52 43. 5	54. 7	52 15. 1	53. 3	10
2 00	56 09. 4	57. 5	55 42. 4	55. 9	55 13. 9	54. 4	54 44. 4	52. 9	54 13. 7	51. 4	2 00
1 50	58 14. 5	55. 5	57 45. 0	53. 9	57 14. 1	52. 3	56 42. 2	50. 7	56 09. 0	49. 2	1 50
40	60 16. 2	53. 2	59 44. 1	51. 5	59 10. 8	49. 9	58 36. 1	48. 3	58 00. 3	46. 8	40
30	62 14. 0	50. 5	61 39. 1	48. 8	61 03. 0	47. 1	60 25. 5	45. 5	59 47. 1	44. 0	30
20	64 07. 1	47. 4	63 29. 3	45. 7	62 50. 0	44. 0	62 09. 6	42. 4	61 28. 1	40. 8	20
10	65 54. 2	43. 8	65 13. 2	42. 1	64 30. 7	40. 4	63 47. 1	38. 8	63 02. 6	37. 3	10
1 00	67 33. 9	39. 6	66 49. 4	37. 9	66 03. 5	36. 3	65 16. 9	34. 7	64 29. 2	33. 3	1 00
0 50	69 04. 6	34. 7	68 16. 3	33. 1	67 27. 2	31. 6	66 37. 2	30. 1	65 46. 5	28. 8	0 50
40	70 23. 7	29. 1	69 32. 2	27. 6	68 39. 6	26. 3	67 46. 7	25. 0	66 53. 1	23. 9	40
30	71 29. 2	22. 8	70 34. 5	21. 5	69 39. 1	20. 3	68 43. 5	19. 3	67 47. 0	18. 4	30
20	72 18. 7	15. 6	71 21. 2	14. 7	70 23. 3	13. 9	69 25. 4	13. 2	68 27. 1	12. 5	20
10	72 49. 6	8. 0	71 50. 2	7. 5	70 50. 7	7. 1	69 51. 2	6. 7	68 51. 7	6. 4	10
0 00	73 0. 0	0. 0	72 0. 0	0. 0	71 0. 0	0. 0	70 0. 0	0. 0	69 0. 0	0. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 29.8	90.1	2 26.7	91.1	2 23.4	92.1	2 20.2	93.1	2 16.9	94.1	5 50
40	4 59.6	90.3	4 56.3	91.3	4 53.1	92.3	4 49.7	93.3	4 46.3	94.3	40
30	7 29.4	90.4	7 26.1	91.4	7 22.8	92.4	7 19.3	93.4	7 15.6	94.4	30
20	9 59.2	90.5	9 55.9	91.5	9 52.4	92.6	9 48.8	93.6	9 44.9	94.6	20
10	12 29.4	90.7	12 25.6	91.7	12 22.1	92.7	12 18.3	93.7	12 14.3	94.8	10
5 00	14 58.7	90.8	14 55.3	91.9	14 51.7	92.9	14 47.7	93.9	14 43.5	95.0	5 00
4 50	17 28.6	90.9	17 25.1	92.0	17 21.3	93.0	17 17.2	94.1	17 12.7	95.1	4 50
40	19 58.3	91.1	19 54.7	92.2	19 50.8	93.2	19 46.6	94.3	19 41.9	95.3	40
30	22 28.0	91.2	22 24.5	92.3	22 20.5	93.4	22 16.0	94.5	22 11.0	95.6	30
20	24 57.8	91.4	24 54.1	92.5	24 49.9	93.6	24 45.2	94.7	24 40.0	95.9	20
10	27 27.6	91.6	27 23.7	92.7	27 19.3	93.8	27 14.6	94.9	27 09.1	96.1	10
4 00	29 57.3	91.7	29 53.3	92.9	29 48.8	94.0	29 43.7	95.2	29 38.0	96.3	4 00
3 50	32 27.0	91.9	32 23.0	93.1	32 18.2	94.3	32 12.9	95.5	32 06.9	96.6	3 50
40	34 56.7	92.1	34 52.5	93.3	34 47.6	94.5	34 41.9	95.7	34 35.6	97.0	40
30	37 26.4	92.3	37 22.1	93.6	37 16.9	94.8	37 11.0	96.1	37 04.2	97.3	30
20	39 56.0	92.5	39 51.5	93.8	39 46.1	95.1	39 39.9	96.4	39 32.7	97.7	20
10	42 25.7	92.8	42 21.0	94.1	42 15.3	95.5	42 08.7	96.8	42 01.2	98.1	10
3 00	44 55.3	93.0	44 50.3	94.4	44 44.4	95.8	44 37.4	97.2	44 29.4	98.6	3 00
2 50	47 24.9	93.3	47 19.6	94.7	47 13.4	96.2	47 05.9	97.7	46 57.3	99.1	2 50
40	49 54.4	93.6	49 48.9	95.1	49 42.2	96.7	49 34.2	98.2	49 25.0	99.7	40
30	52 23.9	93.9	52 18.0	95.5	52 10.9	97.2	52 02.4	98.8	51 52.6	100.4	30
20	54 53.3	94.3	54 47.1	96.0	54 39.4	97.7	54 30.3	99.4	54 19.8	101.1	20
10	57 22.6	94.7	57 15.9	96.5	57 07.8	98.4	56 57.9	100.2	56 46.6	102.0	10
2 00	59 51.9	95.2	59 44.7	97.2	59 35.8	99.1	59 25.2	101.1	59 12.8	103.0	2 00
1 50	62 21.0	95.8	62 13.1	97.9	62 03.6	100.0	61 51.9	102.1	61 38.4	104.2	1 50
40	64 50.0	96.4	64 41.6	98.7	64 30.8	101.0	64 18.1	103.3	64 03.2	105.5	40
30	67 18.7	97.2	67 09.2	99.8	66 57.5	102.3	66 43.5	104.7	66 26.6	107.2	30
20	69 47.1	98.2	69 36.7	101.0	69 23.5	103.8	69 07.6	106.5	68 49.4	109.2	20
10	72 15.2	99.4	72 03.2	102.6	71 48.2	105.7	71 30.5	108.8	71 09.8	111.7	10
1 00	74 42.6	101.0	74 28.8	104.7	74 11.5	108.3	73 51.0	111.7	73 27.5	114.9	1 00
0 50	77 09.0	103.3	76 52.5	107.5	76 32.5	111.7	76 08.2	115.6	75 41.0	119.2	0 50
40	79 33.8	106.5	79 14.0	111.6	78 49.4	116.4	78 20.5	120.9	77 47.9	124.9	40
30	81 55.5	111.7	81 30.0	117.9	80 59.5	123.6	80 23.5	128.6	79 44.5	133.0	30
20	84 10.2	120.9	83 35.9	128.6	82 55.8	134.9	82 11.5	140.2	81 24.2	144.5	20
10	86 05.7	140.2	85 17.0	148.0	84 24.6	153.4	83 29.7	157.4	82 34.0	160.4	10
0 00	87 0.0	180.0	86 0.0	180.0	85 0.0	180.0	84 0.0	180.0	83 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 13.6	95.1	2 10.2	96.1	2 06.7	97.1	2 03.3	98.1	1 59.8	99.1	5 50
40	4 42.7	95.3	4 39.0	96.3	4 35.4	97.3	4 31.5	98.3	4 27.6	99.3	40
30	7 11.9	95.4	7 07.9	96.4	7 03.9	97.4	6 59.8	98.4	6 55.4	99.5	30
20	9 40.9	95.6	9 36.8	96.6	9 32.5	97.6	9 27.8	98.6	9 23.2	99.7	20
10	12 10.0	95.8	12 05.6	96.8	12 00.8	97.8	11 55.9	98.8	11 50.7	99.9	10
5 00	14 39.0	96.0	14 34.2	97.0	14 29.2	98.0	14 23.9	99.1	14 18.3	100.1	5 00
4 50	17 08.0	96.2	17 02.9	97.2	16 57.5	98.3	16 51.8	99.3	16 45.7	100.3	4 50
40	19 36.8	96.4	19 31.5	97.5	19 25.7	98.5	19 19.5	99.6	19 13.0	100.6	40
30	22 05.7	96.7	21 59.9	97.8	21 53.8	98.8	21 47.2	99.8	21 40.3	100.9	30
20	24 34.4	96.9	24 28.4	98.1	24 21.8	99.1	24 14.7	100.2	24 07.2	101.3	20
10	27 03.1	97.2	26 56.7	98.3	26 49.6	99.4	26 42.2	100.6	26 33.9	101.7	10
4 00	29 31.7	97.5	29 24.8	98.6	29 17.4	99.7	29 09.2	100.9	29 00.7	102.0	4 00
3 50	32 00.2	97.8	31 52.9	99.0	31 44.8	100.1	31 36.4	101.3	31 27.0	102.4	3 50
40	34 28.5	98.2	34 20.7	99.4	34 12.3	100.6	34 03.1	101.8	33 53.2	102.9	40
30	36 56.6	98.6	36 48.4	99.8	36 39.4	101.0	36 29.7	102.3	36 19.1	103.5	30
20	39 24.8	99.0	39 15.9	100.3	39 06.3	101.5	38 55.8	102.8	38 44.5	104.1	20
10	41 52.6	99.5	41 43.2	100.8	41 32.9	102.1	41 21.7	103.4	41 09.5	104.7	10
3 00	44 20.2	100.0	44 10.3	101.4	43 59.2	102.7	43 47.2	104.1	43 34.3	105.4	3 00
2 50	46 47.7	100.6	46 36.9	102.0	46 25.1	103.4	46 12.3	104.8	45 58.4	106.2	2 50
40	49 14.7	101.2	49 03.3	102.7	48 50.7	104.2	48 36.8	105.7	48 21.9	107.2	40
30	51 41.5	101.9	51 29.1	103.5	51 15.4	105.1	51 00.7	106.6	50 44.6	108.2	30
20	54 07.8	102.8	53 54.6	104.5	53 39.9	106.1	53 23.8	107.7	53 06.5	109.3	20
10	56 33.8	103.8	56 19.1	105.5	56 03.4	107.2	55 45.9	109.0	55 27.3	110.6	10
2 00	58 58.8	104.9	58 43.2	106.7	58 25.9	108.5	58 07.1	110.4	57 46.8	112.1	2 00
1 50	61 23.2	106.2	61 06.0	108.1	60 47.3	110.1	60 26.7	112.0	60 05.6	113.9	1 50
40	63 46.5	107.7	63 27.8	109.8	63 07.2	111.9	62 44.6	114.0	62 20.5	115.9	40
30	66 08.2	109.5	65 47.6	111.8	65 24.8	114.1	65 00.4	116.3	64 33.8	118.3	30
20	68 28.6	111.8	68 05.6	114.3	67 40.5	116.7	67 13.0	119.0	66 43.8	121.2	20
10	70 46.4	114.6	70 20.5	117.3	69 52.2	119.8	69 22.0	122.3	68 49.5	124.7	10
1 00	73 00.8	118.1	72 31.7	121.0	71 59.9	123.8	71 25.8	126.4	70 49.7	128.9	1 00
0 50	75 10.0	122.6	74 36.5	125.8	74 00.5	128.7	73 22.0	131.5	72 42.0	134.0	0 50
40	77 12.0	128.6	76 33.4	132.0	75 52.3	135.1	75 09.0	137.8	74 24.1	140.4	40
30	79 02.0	136.8	78 17.2	140.2	77 30.5	143.2	76 41.7	145.8	75 51.5	148.1	30
20	80 34.0	148.0	79 42.5	151.0	78 49.5	153.5	77 55.3	155.6	77 00.5	157.5	20
10	81 37.1	162.6	80 39.6	164.5	79 41.6	166.0	78 43.3	167.2	77 44.6	168.3	10
0 00	82 0.0	180.0	81 0.0	180.0	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 56.3	100.1	1 52.7	101.1	1 49.2	102.1	1 45.5	103.1	1 41.8	104.1	5 50
40	4 23.7	100.3	4 19.7	101.3	4 15.6	102.3	4 11.2	103.3	4 06.9	104.3	40
30	6 51.0	100.5	6 46.4	101.5	6 41.8	102.5	6 37.1	103.5	6 32.1	104.5	30
20	9 18.3	100.7	9 13.2	101.7	9 08.0	102.7	9 02.6	103.7	8 57.0	104.7	20
10	11 45.5	100.9	11 39.9	101.9	11 34.2	102.9	11 28.2	103.9	11 22.0	104.9	10
5 00	14 12.4	101.1	14 06.4	102.1	14 00.1	103.2	13 53.4	104.2	13 46.5	105.2	5 00
4 50	16 39.4	101.4	16 32.7	102.4	16 24.9	103.5	16 18.6	104.5	16 10.9	105.5	4 50
40	19 06.2	101.7	18 59.0	102.7	18 51.4	103.8	18 43.5	104.8	18 35.1	105.9	40
30	21 32.9	102.0	21 25.0	103.0	21 16.9	104.1	21 08.3	105.2	20 59.7	106.2	30
20	23 59.3	102.4	23 50.8	103.4	23 42.0	104.5	23 32.6	105.6	23 22.8	106.6	20
10	26 25.5	102.8	26 16.4	103.8	26 06.8	104.9	25 56.7	106.0	25 46.2	107.1	10
4 00	28 51.4	103.2	28 41.7	104.3	28 31.5	105.4	28 20.6	106.5	28 09.1	107.6	4 00
3 50	31 17.1	103.6	31 06.7	104.8	30 55.7	105.9	30 44.1	107.1	30 31.7	108.2	3 50
40	33 42.6	104.1	33 31.5	105.3	33 19.5	106.5	33 06.9	107.7	32 53.6	108.8	40
30	36 07.8	104.7	35 55.5	105.9	35 42.9	107.1	35 29.5	108.3	35 15.3	109.5	30
20	38 32.4	105.3	38 19.5	106.6	38 05.9	107.8	37 51.3	109.0	37 36.1	110.3	20
10	40 56.7	106.0	40 42.9	107.3	40 28.2	108.6	40 12.7	109.8	39 56.3	111.1	10
3 00	43 20.4	106.8	43 05.6	108.1	42 49.9	109.4	42 33.1	110.7	42 15.6	112.0	3 00
2 50	45 43.5	107.6	45 27.6	109.0	45 10.5	110.4	44 52.7	111.7	44 34.9	113.1	2 50
40	48 05.8	108.6	47 48.8	110.0	47 30.6	111.4	47 11.4	112.8	46 51.1	114.2	40
30	50 27.4	109.7	50 09.3	111.2	49 49.5	112.6	49 28.9	114.1	49 07.2	115.5	30
20	52 47.9	110.9	52 28.1	112.5	52 07.2	114.0	51 44.9	115.5	51 21.4	117.0	20
10	55 07.1	112.3	54 45.9	113.9	55 23.0	115.5	53 59.7	117.1	53 34.1	118.6	10
2 00	57 25.1	113.9	57 02.0	115.6	56 37.3	117.3	56 11.4	118.9	55 44.3	120.5	2 00
1 50	59 41.0	115.7	59 15.9	117.5	58 49.3	119.3	58 21.4	121.0	57 52.0	122.6	1 50
40	61 54.7	117.9	61 27.5	119.8	60 58.6	121.6	60 28.1	123.3	59 56.4	125.1	40
30	64 05.5	120.4	63 35.7	122.4	63 04.4	124.3	62 31.4	126.1	61 57.0	127.9	30
20	66 12.9	123.4	65 40.2	125.4	65 05.9	127.4	64 29.9	129.3	63 52.6	131.3	20
10	68 15.3	126.9	67 39.6	129.0	67 01.8	131.1	66 22.7	133.0	65 42.3	135.1	10
1 00	70 11.9	131.2	69 32.2	133.4	68 51.0	135.4	68 08.4	137.4	67 24.5	139.4	1 00
0 50	72 00.0	136.4	71 16.4	138.6	70 31.2	140.6	69 45.0	142.5	68 57.3	144.4	0 50
40	73 37.6	142.7	72 49.4	144.8	72 00.5	146.6	71 10.1	148.4	70 19.0	150.0	40
30	74 00.5	150.2	74 08.2	152.1	73 14.8	153.7	72 21.3	155.2	71 26.5	156.6	30
20	76 04.8	159.1	75 08.6	160.5	74 11.9	161.7	73 14.9	162.8	72 17.4	163.9	20
10	76 45.8	169.2	75 46.8	169.9	74 47.7	170.6	73 48.5	171.2	72 49.2	171.8	10
0 00	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 38.2	105.1	1 34.4	106.1	1 30.6	107.1	1 26.7	108.1	1 23.1	109.1	5 50
40	4 02.6	105.3	3 58.2	106.3	3 53.7	107.3	3 49.1	108.3	3 44.5	109.3	40
30	6 27.2	105.5	6 21.9	106.5	6 16.7	107.5	6 11.3	108.5	6 05.7	109.5	30
20	8 51.4	105.7	8 45.5	106.7	8 39.5	107.7	8 33.2	108.7	8 26.8	109.7	20
10	11 15.6	105.9	11 08.9	107.0	11 02.1	108.0	10 55.1	109.0	10 47.9	110.0	10
5 00	13 39.5	106.2	13 32.1	107.3	13 24.4	108.3	13 16.5	109.3	13 08.4	110.3	5 00
4 50	16 03.3	106.5	15 55.0	107.6	15 46.5	108.6	15 37.8	109.6	15 28.8	110.7	4 50
40	18 26.6	106.9	18 17.6	107.9	18 08.4	109.0	17 58.7	110.0	17 48.7	111.1	40
30	20 49.8	107.3	20 39.9	108.3	20 29.8	109.4	20 19.1	110.4	20 08.3	111.5	30
20	23 12.7	107.7	23 02.0	108.8	22 51.0	109.9	22 39.4	110.9	22 27.4	112.0	20
10	25 35.2	108.2	25 23.6	109.3	25 11.6	110.4	24 59.1	111.4	24 46.2	112.5	10
4 00	27 57.2	108.8	27 44.7	109.9	27 31.7	111.0	27 18.2	112.0	27 04.1	113.1	4 00
3 50	30 18.9	109.4	30 05.4	110.5	29 51.3	111.6	29 36.7	112.7	29 21.5	113.8	3 50
40	32 39.9	110.0	32 25.4	111.1	32 10.3	112.3	31 54.6	113.4	31 38.2	114.5	40
30	35 00.4	110.7	34 44.8	111.9	34 28.7	113.1	34 11.7	114.2	33 54.1	115.3	30
20	37 20.2	111.5	37 03.5	112.7	36 46.1	113.9	36 27.8	115.1	36 08.9	116.2	20
10	39 39.2	112.3	39 21.2	113.6	39 02.7	114.8	38 43.1	116.0	38 22.8	117.2	10
3 00	41 57.3	113.3	41 38.0	114.6	41 17.9	115.8	40 57.0	117.1	40 35.2	118.3	3 00
2 50	44 14.3	114.4	43 53.7	115.7	43 32.2	117.0	43 09.7	118.3	42 46.5	119.5	2 50
40	46 30.1	115.6	46 07.9	116.9	45 44.9	118.3	45 20.8	119.6	44 55.9	120.8	40
30	48 44.4	116.9	48 20.4	118.3	47 55.9	119.7	47 30.2	121.0	47 03.6	122.3	30
20	50 57.1	118.4	50 31.7	119.9	50 05.1	121.3	49 37.4	122.6	49 08.9	124.0	20
10	53 07.7	120.1	52 40.4	121.6	52 11.7	123.0	51 42.4	124.4	51 11.7	125.8	10
2 00	55 16.1	122.1	54 46.7	123.6	54 16.2	125.0	53 44.3	126.5	53 11.6	127.9	2 00
1 50	57 21.5	124.2	56 49.9	125.8	56 17.0	127.3	55 43.0	128.8	55 08.0	130.2	1 50
40	59 23.6	126.7	58 49.5	128.3	58 14.1	129.9	57 37.6	131.4	57 00.2	132.8	40
30	61 21.5	129.5	60 44.7	131.2	60 06.9	132.8	59 27.6	134.3	58 47.6	135.7	30
20	63 14.3	132.8	62 34.7	134.5	61 53.9	136.1	61 12.0	137.5	60 29.1	139.0	20
10	65 00.9	136.6	64 18.3	138.2	63 34.4	139.8	62 49.5	141.2	62 03.8	142.6	10
1 00	66 39.9	140.9	65 53.9	142.5	65 06.9	144.0	64 19.1	145.4	63 30.4	146.7	1 00
0 50	68 09.4	145.8	67 20.0	147.3	66 30.0	148.7	65 39.1	150.1	64 47.7	151.3	0 50
40	69 27.5	151.5	68 34.9	152.8	67 41.9	154.1	66 48.1	155.2	65 53.9	156.3	40
30	70 31.6	157.8	69 36.3	158.9	68 40.5	159.9	67 44.3	160.8	66 47.7	161.7	30
20	71 20.0	164.8	70 22.1	165.6	69 24.1	166.3	68 25.7	167.0	67 27.3	167.6	20
10	71 49.8	172.3	70 50.4	172.7	69 50.9	173.1	68 51.3	173.4	67 51.7	173.7	10
0 00	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 19.1	110.1	1 15.4	111.1	1 11.4	112.1	1 07.6	113.1	1 03.7	114.1	5 50
40	3 39.8	110.3	3 35.0	111.3	3 30.1	112.3	3 25.3	113.3	3 20.3	114.3	40
30	6 00.2	110.5	5 54.5	111.5	5 48.7	112.5	5 42.7	113.5	5 36.7	114.5	30
20	8 20.3	110.7	8 13.8	111.7	8 06.9	112.7	8 00.0	113.7	7 52.9	114.7	20
10	10 40.4	111.0	10 32.8	112.0	10 25.0	113.0	10 17.0	114.0	10 08.8	115.0	10
5 00	13 00.1	111.3	12 51.5	112.3	12 42.7	113.4	12 33.6	114.4	12 24.3	115.4	5 00
4 50	15 19.4	111.7	15 09.9	112.7	15 00.0	113.8	14 49.8	114.8	14 39.5	115.8	4 50
40	17 38.4	112.1	17 27.8	113.1	17 16.9	114.2	17 05.7	115.2	16 54.1	116.2	40
30	19 57.0	112.6	19 45.4	113.6	19 33.2	114.6	19 20.9	115.6	19 08.2	116.7	30
20	22 15.0	113.1	22 02.4	114.1	21 49.2	115.2	21 35.7	116.2	21 21.8	117.3	20
10	24 32.7	113.6	24 18.7	114.7	24 04.4	115.8	23 49.7	116.8	23 34.6	117.9	10
4 00	26 49.6	114.2	26 34.6	115.3	26 19.1	116.4	26 03.1	117.5	25 46.6	118.6	4 00
3 50	29 05.7	114.9	28 49.6	116.0	28 32.8	117.1	28 15.5	118.2	27 57.7	119.3	3 50
40	31 21.2	115.7	31 03.8	116.8	30 45.7	117.9	30 27.1	119.0	30 07.9	120.1	40
30	33 35.8	116.5	33 17.1	117.6	32 57.6	118.8	32 37.6	119.9	32 16.9	121.0	30
20	35 49.3	117.4	35 29.2	118.5	35 08.3	119.7	34 46.8	120.8	34 24.6	122.0	20
10	38 01.8	118.4	37 40.2	119.6	37 17.7	120.8	36 54.7	121.9	36 30.9	123.1	10
3 00	40 12.8	119.5	39 49.7	120.7	39 25.7	121.9	39 01.0	123.1	38 35.6	124.3	3 00
2 50	42 22.4	120.8	41 57.6	122.0	41 31.9	123.2	41 05.7	124.4	40 38.5	125.6	2 50
40	44 30.2	122.1	44 03.7	123.4	43 36.3	124.6	43 08.1	125.8	42 39.2	127.0	40
30	46 36.0	123.6	46 07.6	124.9	45 38.4	126.2	45 08.4	127.4	44 37.6	128.7	30
20	48 39.5	125.3	48 09.3	126.6	47 38.1	127.9	47 06.0	129.1	46 33.2	130.4	20
10	50 40.4	127.2	50 07.9	128.5	49 34.6	129.8	49 00.7	131.1	48 25.7	132.2	10
2 00	52 38.0	129.3	52 03.6	130.6	51 28.0	131.9	50 51.8	133.2	50 14.7	134.4	2 00
1 50	54 32.1	131.6	53 55.2	133.0	53 17.5	134.3	52 39.0	135.5	51 59.5	136.8	1 50
40	56 21.8	134.2	55 42.6	135.6	55 02.4	136.9	54 21.4	138.1	53 39.7	139.4	40
30	58 06.6	137.1	57 24.7	138.5	56 42.1	139.7	55 58.6	140.9	55 14.5	142.2	30
20	59 45.4	140.4	59 01.1	141.7	58 15.8	142.9	57 29.8	144.1	56 43.1	145.3	20
10	61 17.3	144.0	60 30.2	145.3	59 42.3	146.5	58 53.9	147.6	58 04.7	148.7	10
1 00	62 41.2	148.0	61 51.5	149.2	61 00.9	150.3	60 10.0	151.4	59 18.5	152.4	1 00
0 50	63 55.7	152.4	63 03.2	153.5	62 10.3	154.5	61 17.0	155.5	60 23.0	156.4	0 50
40	64 59.4	157.3	64 04.7	158.2	63 09.3	159.1	62 13.8	159.9	61 18.0	160.7	40
30	65 50.9	162.6	64 54.0	163.3	63 56.7	164.1	62 59.5	164.7	62 01.7	165.3	30
20	66 28.8	168.2	65 30.3	168.7	64 31.6	169.2	63 32.8	169.6	62 33.9	170.1	20
10	66 52.2	174.1	65 52.5	174.3	64 52.9	174.6	63 53.2	174.8	62 53.4	175.0	10
0 00	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 04. 2	89. 0	0 08. 4	88. 0	0 12. 6	87. 0	0 16. 7	86. 0	6 00
5 50	2 28. 6	90. 2	2 33. 3	89. 2	2 37. 9	88. 2	2 42. 1	87. 2	2 46. 0	86. 2	5 50
40	4 59. 3	90. 4	5 03. 3	89. 3	5 07. 5	88. 4	5 11. 5	87. 4	5 15. 3	86. 4	40
30	7 28. 9	90. 5	7 33. 0	89. 5	7 37. 1	88. 5	7 40. 9	87. 5	7 44. 7	86. 5	30
20	9 58. 5	90. 7	10 02. 7	89. 7	10 06. 6	88. 7	10 10. 4	87. 7	10 14. 0	86. 7	20
10	12 28. 2	90. 9	12 32. 3	89. 9	12 36. 2	88. 8	12 40. 0	87. 8	12 43. 4	86. 8	10
5 00	14 57. 8	91. 1	15 01. 9	90. 0	15 05. 8	89. 0	15 09. 5	88. 0	15 12. 8	86. 9	5 00
4 50	17 27. 4	91. 3	17 31. 6	90. 2	17 35. 4	89. 2	17 39. 0	88. 1	17 42. 3	87. 1	4 50
40	19 56. 9	91. 5	20 01. 1	90. 4	20 05. 0	89. 3	20 08. 6	88. 3	20 11. 7	87. 2	40
30	22 26. 5	91. 7	22 30. 8	90. 6	22 34. 7	89. 5	22 38. 2	88. 4	22 41. 2	87. 3	30
20	24 56. 1	91. 9	25 00. 5	90. 8	25 04. 3	89. 7	25 07. 7	88. 6	25 10. 6	87. 5	20
10	27 25. 6	92. 1	27 30. 1	90. 9	27 33. 9	89. 8	27 37. 4	88. 7	27 40. 2	87. 6	10
4 00	29 55. 1	92. 3	29 59. 7	91. 1	30 03. 6	90. 0	30 06. 9	88. 9	30 09. 7	87. 7	4 00
3 50	32 24. 6	92. 5	32 29. 2	91. 4	32 33. 2	90. 2	32 36. 6	89. 0	32 39. 2	87. 8	3 50
40	34 54. 1	92. 8	34 58. 9	91. 6	35 02. 9	90. 4	35 06. 2	89. 1	35 08. 7	87. 9	40
30	37 23. 6	93. 1	37 28. 4	91. 8	37 32. 6	90. 6	37 35. 8	89. 3	37 38. 3	88. 0	30
20	39 53. 0	93. 4	39 57. 9	92. 0	40 02. 2	90. 8	40 05. 4	89. 5	40 07. 8	88. 1	20
10	42 22. 4	93. 7	42 27. 5	92. 3	42 31. 8	91. 0	42 35. 0	89. 6	42 37. 4	88. 2	10
3 00	44 51. 6	94. 0	44 57. 0	92. 6	45 01. 4	91. 2	45 04. 7	89. 8	45 06. 9	88. 3	3 00
2 50	47 20. 8	94. 4	47 26. 5	92. 9	47 30. 9	91. 4	47 34. 4	89. 9	47 36. 5	88. 4	2 50
40	49 50. 0	94. 8	49 55. 9	93. 2	50 00. 5	91. 7	50 04. 0	90. 1	50 06. 0	88. 6	40
30	52 19. 1	95. 2	52 25. 1	93. 6	52 30. 1	91. 9	52 33. 5	90. 3	52 35. 7	88. 6	30
20	54 48. 1	95. 7	54 54. 6	94. 0	54 59. 6	92. 2	55 03. 2	90. 5	55 05. 3	88. 7	20
10	57 16. 8	96. 3	57 23. 8	94. 4	57 29. 1	92. 5	57 32. 8	90. 7	57 34. 9	88. 8	10
2 00	59 45. 6	96. 9	59 53. 0	94. 9	59 58. 6	92. 9	60 02. 4	90. 9	60 04. 5	88. 9	2 00
1 50	62 14. 0	97. 6	62 21. 9	95. 5	62 28. 0	93. 4	62 32. 0	91. 2	62 34. 1	89. 0	1 50
40	64 42. 1	98. 5	64 50. 8	96. 2	64 57. 3	93. 9	65 01. 7	91. 5	65 03. 8	89. 1	40
30	67 10. 0	99. 6	67 19. 5	97. 0	67 26. 6	94. 4	67 31. 0	91. 8	67 33. 3	89. 2	30
20	69 37. 2	100. 9	69 47. 8	98. 0	69 55. 7	95. 1	70 00. 8	92. 2	70 02. 9	89. 3	20
10	72 03. 8	102. 5	72 15. 8	99. 2	72 24. 8	96. 0	72 30. 2	92. 7	72 32. 6	89. 4	10
1 00	74 29. 3	104. 6	74 43. 1	100. 9	74 53. 3	97. 2	74 59. 8	93. 3	75 02. 3	89. 5	1 00
0 50	76 53. 1	107. 5	77 09. 5	103. 2	77 22. 0	98. 7	77 29. 0	94. 2	77 31. 8	89. 6	0 50
40	79 14. 2	111. 6	79 34. 1	106. 4	79 49. 0	101. 0	79 58. 1	95. 4	80 01. 4	89. 6	40
30	81 30. 3	117. 9	81 55. 5	111. 6	82 15. 0	104. 7	82 26. 5	97. 3	82 31. 1	89. 7	30
20	83 36. 0	128. 5	84 10. 4	120. 9	84 37. 3	111. 7	84 54. 6	101. 2	85 00. 7	89. 8	20
10	85 17. 0	148. 0	86 05. 8	140. 2	86 48. 1	128. 6	87 18. 7	111. 8	87 30. 4	89. 9	10
0 00	86 0. 0	180. 0	87 0. 0	180. 0	88 0. 0	180. 0	89 0. 0	180. 0	90 0. 0	Ind.	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 20.9	85.0	0 25.1	84.0	0 29.2	83.0	0 33.3	82.0	0 37.5	81.0	6 00
5 50	2 50.0	85.2	2 54.0	84.2	2 57.7	83.2	3 01.6	82.2	3 05.3	81.2	5 50
40	5 19.1	85.4	5 22.8	84.4	5 26.3	83.4	5 29.8	82.3	5 33.2	81.3	40
30	7 48.3	85.5	7 51.8	84.5	7 54.9	83.5	7 58.2	82.5	8 01.2	81.5	30
20	10 17.5	85.6	10 20.7	84.6	10 23.7	83.6	10 26.5	82.6	10 29.2	81.6	20
10	12 46.7	85.8	12 49.7	84.8	12 52.4	83.7	12 54.9	82.7	12 57.3	81.7	10
5 00	15 15.9	85.9	15 18.6	84.9	15 21.1	83.8	15 23.3	82.8	15 25.3	81.8	5 00
4 50	17 45.2	86.0	17 47.8	85.0	17 50.0	83.9	17 51.9	82.9	17 53.4	81.8	4 50
40	20 14.5	86.1	20 16.8	85.1	20 18.7	84.0	20 20.3	82.9	20 21.5	81.9	40
30	22 43.8	86.2	22 45.9	85.2	22 47.6	84.1	22 48.9	83.0	22 49.6	81.9	30
20	25 13.1	86.4	25 15.0	85.2	25 16.4	84.1	25 17.3	83.0	25 17.8	81.9	20
10	27 42.4	86.5	27 44.2	85.3	27 45.1	84.2	27 45.8	83.1	27 45.9	81.9	10
4 00	30 11.8	86.6	30 13.3	85.4	30 14.1	84.2	30 14.4	83.1	30 14.1	81.9	4 00
3 50	32 41.1	86.6	32 42.6	85.4	32 43.1	84.3	32 43.1	83.1	32 42.4	81.9	3 50
40	35 10.6	86.7	35 11.6	85.5	35 11.9	84.3	35 11.5	83.0	35 10.4	81.8	40
30	37 39.9	86.8	37 41.0	85.5	37 40.8	84.2	37 40.1	83.0	37 38.5	81.7	30
20	40 09.4	86.8	40 09.9	85.5	40 09.6	84.2	40 08.5	82.9	40 06.5	81.6	20
10	42 38.8	86.9	42 39.2	85.5	42 38.5	84.2	42 37.0	82.8	42 34.5	81.5	10
3 00	45 08.2	86.9	45 08.3	85.5	45 07.4	84.1	45 05.4	82.7	45 02.5	81.3	3 00
2 50	47 37.6	87.0	47 37.6	85.5	47 36.2	84.0	47 33.8	82.5	47 30.3	81.0	2 50
40	50 07.0	87.0	50 06.6	85.4	50 04.9	83.9	50 02.2	82.3	49 58.0	80.8	40
30	52 36.4	87.0	52 35.8	85.3	52 33.7	83.7	52 30.4	82.1	52 25.8	80.4	30
20	55 05.9	87.0	55 05.0	85.2	55 02.4	83.5	54 58.5	81.8	54 53.2	80.0	20
10	57 35.1	87.0	57 34.0	85.1	57 31.1	83.2	57 26.6	81.4	57 20.3	79.5	10
2 00	60 04.8	86.9	60 03.1	84.9	59 59.6	82.9	59 54.4	80.9	59 47.5	79.0	2 00
1 50	62 34.1	86.9	62 32.1	84.7	62 28.0	82.5	62 22.0	80.4	62 14.2	78.3	1 50
40	65 03.7	86.7	65 01.1	84.4	64 56.3	82.0	64 49.4	79.7	64 40.4	77.4	40
30	67 32.9	86.6	67 30.0	84.0	67 24.2	81.4	67 16.6	78.8	67 06.0	76.3	30
20	70 02.4	86.4	69 58.7	83.4	69 52.2	80.6	69 43.0	77.7	69 31.0	74.9	20
10	72 31.4	86.0	72 27.2	82.7	72 19.6	79.5	72 08.7	76.3	71 55.0	73.1	10
1 00	75 01.0	85.6	74 55.5	81.8	74 46.2	78.0	74 33.5	74.3	74 17.1	70.7	1 00
0 50	77 30.0	85.0	77 23.5	80.4	77 12.0	75.9	76 56.7	71.6	76 37.0	67.4	0 50
40	79 58.9	83.9	79 50.4	78.2	79 36.3	72.9	79 17.0	67.6	78 52.9	62.8	40
30	82 27.2	82.1	82 16.5	74.7	81 57.0	67.8	81 32.0	61.4	81 02.0	55.8	30
20	84 55.0	78.5	84 37.9	67.9	84 11.3	58.7	83 37.1	50.9	82 57.1	44.5	20
10	87 18.9	68.1	86 48.4	51.1	86 06.1	39.6	85 17.4	31.7	84 25.0	26.3	10
0 00	89 0.0	0.0	88 00.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 41.7	80.0	0 45.8	79.0	0 49.9	78.0	0 53.9	77.0	0 58.0	76.0	6 00
5 50	3 09.0	80.2	3 12.6	79.2	3 16.2	78.2	3 19.7	77.2	3 23.3	76.2	5 50
40	5 36.5	80.3	5 39.8	79.3	5 42.8	78.3	5 45.7	77.3	5 48.6	76.3	40
30	8 04.2	80.5	8 06.7	79.4	8 09.3	78.4	8 11.7	77.4	8 14.0	76.4	30
20	10 31.7	80.6	10 33.9	79.6	10 35.9	78.5	10 37.8	77.5	10 39.6	76.5	20
10	12 59.3	80.7	13 01.0	79.6	13 02.6	78.6	13 04.0	77.6	13 05.1	76.5	10
5 00	15 26.9	80.7	15 28.3	79.7	15 29.3	78.7	15 30.1	77.6	15 30.6	76.6	5 00
4 50	17 54.6	80.8	17 55.3	79.7	17 55.9	78.7	17 56.3	77.6	17 56.1	76.6	4 50
40	20 22.3	80.8	20 22.7	79.8	20 22.7	78.7	20 22.3	77.6	20 21.7	76.6	40
30	22 50.0	80.8	22 49.9	79.7	22 49.5	78.7	22 48.6	77.6	22 47.1	76.5	30
20	25 17.8	80.8	25 17.2	79.7	25 16.1	78.6	25 14.6	77.5	25 12.7	76.4	20
10	27 45.4	80.8	27 44.4	79.7	27 42.8	78.5	27 40.7	77.4	27 38.0	76.3	10
4 00	30 13.2	80.8	30 11.6	79.6	30 09.5	78.4	30 06.7	77.3	30 03.4	76.1	4 00
3 50	32 40.8	80.7	32 38.8	79.5	32 36.0	78.3	32 32.6	77.1	32 28.5	75.9	3 50
40	35 08.5	80.6	35 05.9	79.4	35 02.5	78.2	34 58.4	76.9	34 53.7	75.7	40
30	37 36.1	80.5	37 32.8	79.2	37 28.8	77.9	37 24.1	76.7	37 18.6	75.4	30
20	40 03.6	80.3	39 59.8	79.0	39 55.1	77.7	39 49.7	76.4	39 43.3	75.1	20
10	42 31.1	80.1	42 26.6	78.7	42 21.3	77.4	42 15.0	76.0	42 07.7	74.7	10
3 00	44 58.5	79.9	44 53.4	78.4	44 47.1	77.0	44 40.1	75.6	44 32.0	74.3	3 00
2 50	47 25.6	79.6	47 19.9	78.1	47 13.0	76.6	47 04.9	75.2	46 55.7	73.7	2 50
40	49 52.8	79.2	49 46.2	77.7	49 38.3	76.1	49 29.3	74.6	49 19.3	73.1	40
30	52 19.6	78.8	52 12.1	77.2	52 03.4	75.5	51 53.4	74.0	51 42.1	72.4	30
20	54 46.3	78.3	54 38.0	76.6	54 28.1	74.9	54 17.0	73.2	54 04.5	71.5	20
10	57 12.7	77.7	57 03.3	75.9	56 52.3	74.1	56 39.9	72.3	56 25.9	70.5	10
2 00	59 38.8	77.0	59 28.2	75.1	59 15.8	73.1	59 02.0	71.2	58 46.5	69.4	2 00
1 50	62 04.2	76.1	61 52.2	74.1	61 38.6	72.0	61 23.1	70.0	61 05.9	68.0	1 50
40	64 29.2	75.1	64 15.7	72.8	64 00.4	70.6	63 43.1	68.4	63 23.9	66.3	40
30	66 53.3	73.8	66 38.1	71.3	66 20.7	68.9	66 01.1	66.6	65 39.6	64.3	30
20	69 16.4	72.1	68 59.1	69.4	68 39.4	66.8	68 17.4	64.3	67 53.3	61.8	20
10	71 37.8	70.0	71 18.0	67.0	70 55.6	64.2	70 30.6	61.4	70 03.0	58.8	10
1 00	73 57.4	67.3	73 34.4	64.0	73 08.3	60.8	72 39.8	57.8	72 08.9	55.0	1 00
0 50	76 13.3	63.5	75 46.3	59.9	75 16.3	56.4	74 43.0	53.2	74 07.5	50.2	0 50
40	78 24.4	58.3	77 52.3	54.3	77 16.4	50.5	76 38.1	47.1	75 57.5	44.0	40
30	80 26.5	50.7	79 47.5	46.4	79 05.3	42.4	78 20.5	39.0	77 33.5	36.0	30
20	82 12.8	39.3	81 25.3	35.0	80 35.6	31.4	79 44.0	28.5	78 51.3	25.9	20
10	83 30.5	22.3	82 34.5	19.3	81 37.6	17.1	80 40.0	15.2	79 42.0	13.6	10
0 00	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 02.1	75.0	1 06.1	74.0	1 10.1	73.0	1 14.1	72.0	1 18.1	71.0	6 00
5 50	3 26.7	75.2	3 30.1	74.2	3 33.3	73.2	3 36.5	72.2	3 36.7	71.2	5 50
40	5 51.4	75.3	5 54.0	74.3	5 56.5	73.3	5 59.0	72.3	6 01.4	71.3	40
30	8 16.1	75.4	8 18.1	74.4	8 19.8	73.4	8 21.6	72.4	8 23.1	71.4	30
20	10 41.0	75.5	10 42.3	74.5	10 43.3	73.4	10 44.2	72.4	10 44.9	71.4	20
10	13 05.9	75.5	13 06.4	74.5	13 06.7	73.5	13 06.9	72.4	13 06.7	71.4	10
5 00	15 30.7	75.5	15 30.6	74.5	15 30.2	73.5	15 29.5	72.4	15 28.6	71.4	5 00
4 50	17 55.6	75.5	17 54.8	74.5	17 53.6	73.4	17 52.1	72.4	17 50.2	71.3	4 50
40	20 20.5	75.5	20 19.0	74.4	20 17.0	73.4	20 14.8	72.3	20 12.0	71.2	40
30	22 45.3	75.4	22 43.0	74.3	22 40.4	73.2	22 37.2	72.2	22 33.6	71.1	30
20	25 10.1	75.3	25 07.1	74.2	25 03.6	73.1	24 59.6	72.0	24 55.1	70.9	20
10	27 34.8	75.2	27 31.0	74.0	27 26.7	72.9	27 21.7	71.8	27 16.4	70.7	10
4 00	29 59.3	75.0	29 54.8	73.8	29 49.6	72.7	29 43.8	71.5	29 37.5	70.4	4 00
3 50	32 23.8	74.8	32 18.3	73.6	32 12.3	72.4	32 05.6	71.2	31 58.3	70.1	3 50
40	34 48.1	74.5	34 41.8	73.3	34 34.9	72.1	34 27.2	70.9	34 18.8	69.7	40
30	37 12.2	74.2	37 05.0	72.9	36 57.1	71.7	36 48.4	70.5	36 38.7	69.2	30
20	39 36.0	73.8	39 28.0	72.5	39 18.9	71.2	39 09.2	70.0	38 58.6	68.7	20
10	41 59.5	73.4	41 50.4	72.0	41 40.4	70.7	41 29.5	69.4	41 17.7	68.1	10
3 00	44 22.7	72.9	44 12.6	71.5	44 01.4	70.1	43 49.3	68.8	43 36.2	67.4	3 00
2 50	46 45.5	72.3	46 34.1	70.8	46 21.7	69.4	46 08.4	68.0	45 54.0	66.6	2 50
40	49 07.8	71.6	48 55.3	70.1	48 41.5	68.6	48 26.8	67.2	48 10.9	65.7	40
30	51 29.4	70.8	51 15.5	69.3	51 00.4	67.7	50 44.2	66.2	50 26.6	64.7	30
20	53 50.4	69.9	53 35.1	68.3	53 18.4	66.6	53 00.5	65.0	52 41.3	63.5	20
10	56 10.3	68.7	55 53.4	67.1	55 35.0	65.4	55 15.5	63.7	54 54.2	62.1	10
2 00	58 29.3	67.5	58 10.6	65.7	57 50.4	64.0	57 28.8	62.2	57 05.6	60.5	2 00
1 50	60 46.9	66.0	60 26.1	64.1	60 03.7	62.2	59 40.0	60.4	59 14.5	58.6	1 50
40	63 02.5	64.2	62 39.7	62.2	62 14.9	60.2	61 48.8	58.3	61 20.9	56.5	40
30	65 16.1	62.1	64 50.5	59.9	64 23.3	57.9	63 54.4	55.9	63 23.7	53.9	30
20	67 26.7	59.5	66 58.4	57.2	66 28.1	55.0	65 56.2	52.9	65 22.5	50.9	20
10	69 33.5	56.3	69 01.7	53.9	68 28.1	51.6	67 52.7	49.4	67 15.5	47.4	10
1 00	71 35.1	52.3	70 59.6	49.8	70 22.0	47.4	69 42.8	45.2	69 02.0	43.2	1 00
0 50	73 29.5	47.4	72 49.7	44.8	72 07.6	42.4	71 24.3	40.2	70 39.5	38.2	0 50
40	75 14.1	41.2	74 29.5	38.6	73 42.9	36.3	72 55.1	34.2	72 06.1	32.3	40
30	76 45.0	33.4	75 55.0	31.1	75 03.7	29.0	74 11.5	27.1	73 18.5	25.5	30
20	77 56.9	23.8	77 01.9	22.0	76 06.3	20.3	75 10.2	19.0	74 13.8	17.7	20
10	78 43.7	12.5	77 45.1	11.4	76 46.2	10.5	75 47.3	9.8	74 48.2	9.1	10
0 00	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	75 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 22.0	70.1	1 25.9	69.1	1 29.8	68.1	1 33.7	67.1	1 37.5	66.1	6 00
5 50	3 42.7	70.2	3 45.7	69.2	3 48.7	68.2	3 51.6	67.2	3 54.4	66.2	5 50
40	6 03.5	70.3	6 05.6	69.3	6 07.7	68.3	6 09.5	67.3	6 11.3	66.3	40
30	8 24.4	70.4	8 25.7	69.3	8 26.6	68.3	8 27.5	67.3	8 27.7	66.3	30
20	10 45.3	70.4	10 45.6	69.4	10 45.9	68.4	10 45.6	67.3	10 45.4	66.3	20
10	13 06.3	70.4	13 05.7	69.4	13 04.8	68.3	13 03.7	67.3	13 02.4	66.2	10
5 00	15 27.2	70.3	15 25.7	69.3	15 23.9	68.3	15 21.7	67.2	15 19.3	66.2	5 00
4 50	17 48.2	70.3	17 45.6	69.2	17 42.8	68.2	17 39.7	67.1	17 36.2	66.1	4 50
40	20 08.9	70.2	20 05.4	69.1	20 01.7	68.0	19 57.4	67.0	19 52.9	65.9	40
30	22 29.6	70.0	22 25.2	68.9	22 20.3	67.8	22 15.3	66.8	22 09.4	65.6	30
20	24 50.1	69.8	24 44.6	68.7	24 38.9	67.6	24 32.4	66.5	24 25.6	65.4	20
10	27 10.5	69.5	27 04.0	68.4	26 56.9	67.3	26 49.5	66.2	26 41.5	65.1	10
4 00	29 30.5	69.3	29 23.0	68.1	29 15.0	67.0	29 06.2	65.8	28 56.9	64.7	4 00
3 50	31 50.2	68.9	31 41.6	67.7	31 32.3	66.6	31 22.4	65.4	31 12.1	64.2	3 50
40	34 09.6	68.5	33 59.8	67.3	33 49.5	66.1	33 38.3	64.9	33 26.5	63.7	40
30	36 28.6	68.0	36 17.7	66.8	36 06.0	65.6	35 53.5	64.4	35 40.4	63.1	30
20	38 47.1	67.4	38 34.8	66.2	38 21.9	64.9	38 08.1	63.7	37 53.5	62.5	20
10	41 05.0	66.8	40 51.4	65.5	40 37.0	64.2	40 21.7	63.0	40 05.7	61.7	10
3 00	43 22.1	66.1	43 07.2	64.7	42 51.4	63.4	42 34.5	62.1	42 16.9	60.8	3 00
2 50	45 38.5	65.2	45 22.1	63.8	45 04.6	62.5	44 46.2	61.2	44 27.0	59.8	2 50
40	47 53.8	64.3	47 35.7	62.8	47 16.8	61.5	46 56.6	60.1	46 35.5	58.7	40
30	50 08.1	63.2	49 48.2	61.7	49 27.4	60.3	49 05.5	58.8	48 42.6	57.4	30
20	52 20.8	61.9	51 59.2	60.4	51 36.5	58.9	51 12.7	57.4	50 47.6	55.9	20
10	54 32.0	60.5	54 08.5	58.9	53 43.6	57.4	53 17.7	55.8	52 50.6	54.3	10
2 00	56 41.0	58.8	56 15.2	57.2	55 48.5	55.6	55 20.2	54.0	54 50.7	52.4	2 00
1 50	58 47.9	56.9	58 19.7	55.2	57 50.2	53.5	57 19.6	51.9	56 47.9	50.3	1 50
40	60 51.4	54.7	60 20.8	52.9	59 48.9	51.2	59 15.6	49.6	58 41.0	47.9	40
30	62 51.6	52.0	62 18.0	50.2	61 43.1	48.5	61 07.1	46.8	60 29.9	45.2	30
20	64 47.1	49.0	64 10.5	47.1	63 32.7	45.4	62 53.5	43.7	62 13.1	42.1	20
10	66 37.0	45.4	65 57.0	43.5	65 16.0	41.8	64 33.5	40.1	63 50.0	38.5	10
1 00	68 19.6	41.2	67 36.0	39.4	66 51.7	37.6	66 05.9	36.0	65 19.1	34.5	1 00
0 50	69 53.5	36.3	69 06.1	34.5	68 18.0	32.9	67 29.0	31.4	66 38.6	29.9	0 50
40	71 15.7	30.6	70 24.8	28.9	69 33.4	27.5	68 40.9	26.1	67 47.7	24.8	40
30	72 24.2	24.1	71 30.0	22.6	70 35.1	21.4	69 39.7	20.2	68 44.0	19.2	30
20	73 16.3	16.6	72 19.0	15.5	71 21.6	14.6	70 23.7	13.8	69 25.7	13.1	20
10	73 48.9	8.5	72 49.6	7.9	71 59.3	7.4	70 50.8	7.0	69 51.3	6.7	10
0 00	74 0.0	0.0	73 0.0	0.0	72 0.0	0.0	71 0.0	0.0	70 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 29.6	90.2	2 25.4	91.2	2 21.1	92.2	2 16.9	93.2	2 12.4	94.2	5 50
40	4 59.3	90.4	4 54.9	91.4	4 50.7	92.4	4 46.3	93.4	4 41.8	94.4	40
30	7 28.9	90.5	7 24.6	91.5	7 20.1	92.5	7 15.6	93.5	7 10.9	94.6	30
20	9 58.5	90.7	9 54.1	91.7	9 49.6	92.7	9 44.9	93.7	9 40.0	94.8	20
10	12 28.2	90.9	12 23.8	91.9	12 19.1	92.9	12 14.3	93.9	12 09.2	95.0	10
5 00	14 57.8	91.1	14 53.3	92.1	14 48.5	93.1	14 43.5	94.1	14 38.2	95.2	5 00
4 50	17 27.4	91.3	17 22.8	92.3	17 17.9	93.3	17 12.7	94.4	17 07.2	95.4	4 50
40	19 56.9	91.5	19 52.2	92.5	19 47.2	93.6	19 41.9	94.6	19 36.2	95.7	40
30	22 26.5	91.7	22 21.8	92.7	22 16.5	93.8	22 11.0	94.9	22 04.9	96.0	30
20	24 56.1	91.9	24 51.2	93.0	24 45.9	94.1	24 40.0	95.2	24 33.7	96.3	20
10	27 25.6	92.1	27 20.7	93.2	27 15.0	94.3	27 09.1	95.4	27 02.4	96.6	10
4 00	29 55.1	92.3	29 50.0	93.5	29 44.3	94.6	29 38.0	95.7	29 31.1	96.9	4 00
3 50	32 24.6	92.5	32 19.4	93.7	32 13.4	94.9	32 06.9	96.1	31 59.6	97.2	3 50
40	34 54.1	92.8	34 48.6	94.0	34 42.4	95.2	34 35.6	96.4	34 27.9	97.6	40
30	37 23.6	93.1	37 18.0	94.3	37 11.5	95.6	37 04.2	96.8	36 56.2	98.0	30
20	39 53.0	93.4	39 47.0	94.6	39 40.3	95.9	39 32.7	97.2	39 24.3	98.5	20
10	42 22.4	93.7	42 16.2	95.0	42 09.1	96.3	42 01.1	97.7	41 52.2	99.0	10
3 00	44 51.6	94.0	44 45.2	95.4	44 37.8	96.8	44 29.4	98.2	44 19.8	99.6	3 00
2 50	47 20.8	94.4	47 14.2	95.8	47 06.2	97.3	46 57.3	98.7	46 47.2	100.2	2 50
40	49 50.0	94.8	49 42.9	96.3	49 34.5	97.8	49 25.0	99.3	49 14.3	100.9	40
30	52 19.1	95.2	52 11.6	96.8	52 02.8	98.4	51 52.6	100.0	51 41.2	101.6	30
20	54 48.1	95.7	54 40.0	97.4	54 30.6	99.1	54 19.8	100.8	54 07.5	102.5	20
10	57 16.8	96.3	57 08.4	98.1	56 58.1	99.9	56 46.5	101.7	56 33.4	103.5	10
2 00	59 45.6	96.9	59 36.3	98.9	59 25.4	100.8	59 12.8	102.7	58 58.6	104.6	2 00
1 50	62 14.0	97.6	62 04.0	99.8	61 52.0	101.8	61 38.4	103.9	61 22.9	105.9	1 50
40	64 42.1	98.5	64 31.2	100.8	64 18.2	103.1	64 03.2	105.3	63 46.3	107.5	40
30	67 10.0	99.6	66 58.0	102.1	66 43.5	104.6	66 26.9	107.0	66 08.1	109.3	30
20	69 37.2	100.9	69 23.8	103.6	69 07.8	106.4	68 49.4	109.0	68 28.4	111.6	20
10	72 03.8	102.5	71 48.8	105.6	71 30.6	108.6	71 09.8	111.6	70 46.2	114.4	10
1 00	74 29.3	104.6	74 11.9	108.1	73 51.2	111.6	73 27.5	114.8	73 00.7	117.9	1 00
0 50	76 53.1	107.5	76 32.8	111.6	76 08.5	115.4	75 41.0	119.1	75 10.0	122.5	0 50
40	79 14.2	111.6	78 49.5	116.4	78 20.7	120.8	77 47.9	124.8	77 11.9	128.6	40
30	81 30.3	117.9	80 59.5	123.6	80 23.5	128.5	79 44.5	132.9	79 02.0	136.8	30
20	83 36.0	128.5	82 55.9	134.9	82 11.6	140.1	81 24.2	144.4	80 34.3	148.0	20
10	85 17.0	148.0	84 24.6	153.4	83 30.0	157.4	82 34.0	160.3	81 37.2	162.6	10
0 00	86 0.0	180.0	85 0.0	180.0	84 0.0	180.0	83 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 08.2	95.2	2 03.8	96.2	1 59.2	97.2	1 54.8	98.2	1 50.2	99.2	5 50
40	4 37.2	95.4	4 32.5	96.4	4 27.7	97.4	4 22.8	98.4	4 17.9	99.4	40
30	7 06.1	95.6	7 01.1	96.6	6 56.0	97.6	6 50.8	98.6	6 45.5	99.6	30
20	9 35.0	95.8	9 29.8	96.8	9 24.4	97.8	9 18.8	98.8	9 13.0	99.8	20
10	12 03.9	96.0	11 58.3	97.0	11 52.6	98.0	11 46.6	99.0	11 40.4	100.0	10
5 00	14 32.7	96.2	14 26.8	97.3	14 20.7	98.3	14 14.3	99.3	14 07.7	100.3	5 00
4 50	17 01.4	96.4	16 55.2	97.5	16 48.7	98.5	16 39.8	99.6	16 34.8	100.6	4 50
40	19 30.0	96.7	19 23.5	97.8	19 16.6	98.8	19 09.4	99.9	19 01.8	100.9	40
30	21 58.6	97.0	21 51.7	98.1	21 44.4	99.2	21 36.8	100.2	21 28.6	101.3	30
20	24 27.0	97.3	24 19.7	98.4	24 12.1	99.5	24 03.9	100.6	23 55.3	101.7	20
10	26 55.3	97.7	26 47.7	98.8	26 39.5	99.9	26 30.8	101.0	26 21.6	102.1	10
4 00	29 23.6	98.0	29 15.5	99.2	29 06.8	100.3	28 57.6	101.4	28 47.9	102.6	4 00
3 50	31 51.7	98.4	31 43.2	99.6	31 34.0	100.7	31 24.3	101.9	31 13.8	103.1	3 50
40	34 19.7	98.8	34 10.6	100.0	34 00.9	101.2	33 50.5	102.4	33 39.5	103.6	40
30	36 47.4	99.3	36 38.0	100.5	36 27.5	101.7	36 16.5	103.0	36 04.7	104.2	30
20	39 15.0	99.8	39 04.8	101.1	38 53.9	102.3	38 42.1	103.6	38 29.6	104.8	20
10	41 42.3	100.3	41 31.6	101.7	41 19.9	103.0	41 07.3	104.3	40 53.9	105.6	10
3 00	44 09.4	100.9	43 58.0	102.3	43 45.5	103.7	43 32.2	105.0	43 17.9	106.3	3 00
2 50	46 36.1	101.6	46 23.9	103.0	46 10.7	104.4	45 56.3	105.9	45 41.3	107.2	2 50
40	49 02.6	102.4	48 49.5	103.8	48 35.3	105.3	48 20.1	106.8	48 03.7	108.2	40
30	51 28.4	103.2	51 14.4	104.8	50 59.2	106.3	50 43.0	107.8	50 25.3	109.3	30
20	53 53.9	104.1	53 38.9	105.8	53 22.5	107.4	53 04.9	109.0	52 46.1	110.6	20
10	56 18.5	105.2	56 02.4	107.0	55 44.9	108.7	55 25.9	110.3	55 05.3	112.0	10
2 00	58 42.7	106.5	58 25.1	108.3	58 06.0	110.1	57 45.5	111.9	57 23.5	113.6	2 00
1 50	61 05.6	107.9	60 46.5	109.9	60 25.7	111.8	60 03.4	113.6	59 40.0	115.5	1 50
40	63 27.4	109.6	63 06.5	111.7	62 43.7	113.7	62 19.5	115.7	61 53.5	117.6	40
30	65 47.2	111.6	65 24.4	113.9	64 59.5	116.0	64 32.8	118.1	64 04.3	120.2	30
20	68 05.4	114.1	67 39.9	116.5	67 12.4	118.8	66 43.2	121.0	66 12.0	123.2	20
10	70 20.1	117.1	69 51.9	119.7	69 21.6	122.2	68 49.0	124.5	68 14.6	126.8	10
1 00	72 31.4	120.9	71 59.5	123.7	71 25.2	126.3	70 49.2	128.7	70 11.2	131.1	1 00
0 50	74 36.5	125.7	74 00.2	128.6	73 21.7	131.4	72 41.5	133.9	71 59.4	136.3	0 50
40	76 33.4	131.9	75 52.1	134.9	75 08.7	137.7	74 23.7	140.2	73 37.2	142.6	40
30	78 17.2	140.2	77 30.5	143.1	76 41.4	145.7	75 51.2	148.0	75 00.2	150.1	30
20	79 42.5	150.9	78 49.5	153.4	77 55.2	155.6	77 00.3	157.4	76 04.6	159.1	20
10	80 39.6	164.5	79 41.6	166.0	78 43.2	167.2	77 44.6	168.3	76 45.8	169.1	10
0 00	81 0.0	180.0	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 45.7	100.2	1 41.0	101.2	1 36.4	102.2	1 31.8	103.2	1 27.2	104.2	5 50
40	4 13.0	100.4	4 07.9	101.4	4 02.7	102.4	3 57.4	103.4	3 52.2	104.4	40
30	6 40.2	100.6	6 34.4	101.6	6 28.8	102.6	6 23.0	103.6	6 17.1	104.6	30
20	9 07.2	100.8	9 01.0	101.8	8 54.7	102.8	8 48.3	103.8	8 41.8	104.8	20
10	11 34.2	101.1	11 27.4	102.1	11 20.6	103.1	11 13.6	104.1	11 06.4	105.1	10
5 00	14 00.8	101.4	13 53.7	102.4	13 46.2	103.4	13 38.6	104.4	13 30.8	105.5	5 00
4 50	16 27.4	101.7	16 19.7	102.7	16 11.5	103.7	16 03.4	104.7	15 54.9	105.8	4 50
40	18 53.9	102.0	18 45.6	103.0	18 36.9	104.1	18 27.9	105.1	18 18.7	106.2	40
30	21 20.1	102.4	21 11.2	103.4	21 02.0	104.5	20 52.3	105.5	20 42.3	106.6	30
20	23 46.3	102.8	23 36.7	103.8	23 26.6	104.9	23 16.3	106.0	23 05.5	107.1	20
10	26 12.0	103.2	26 01.8	104.3	25 51.2	105.4	25 40.0	106.5	25 28.3	107.6	10
4 00	28 37.6	103.7	28 26.6	104.8	28 15.2	105.9	28 03.2	107.0	27 50.9	108.1	4 00
3 50	31 02.8	104.2	30 51.1	105.3	30 38.9	106.5	30 26.1	107.6	30 12.7	108.7	3 50
40	33 27.7	104.8	33 15.3	105.9	33 02.1	107.1	32 48.4	108.3	32 34.2	109.4	40
30	35 52.2	105.4	35 38.8	106.6	35 24.9	107.8	35 10.1	109.0	34 55.0	110.2	30
20	38 16.3	106.1	38 02.1	107.3	37 47.1	108.5	37 31.4	109.7	37 15.1	111.0	20
10	40 39.7	106.9	40 24.5	108.1	40 08.7	109.4	39 51.9	110.6	39 34.4	111.9	10
3 00	43 02.7	107.7	42 46.5	109.0	42 29.3	110.3	42 11.5	111.6	41 52.8	112.9	3 00
2 50	45 24.8	108.6	45 07.5	110.0	44 49.4	111.3	44 30.2	112.6	44 10.1	114.0	2 50
40	47 46.3	109.6	47 27.7	111.1	47 08.1	112.4	46 47.6	113.8	46 26.3	115.2	40
30	50 06.6	110.8	49 46.8	112.3	49 25.9	113.7	49 03.8	115.1	48 40.9	116.6	30
20	52 26.0	112.1	52 04.6	113.6	51 42.0	115.2	51 18.5	116.6	50 53.9	118.1	20
10	54 43.9	113.6	54 20.8	115.2	53 56.6	116.8	53 31.3	118.3	53 14.9	119.8	10
2 00	57 00.2	115.3	56 35.4	117.0	56 09.1	118.6	55 41.9	120.2	55 13.5	121.7	2 00
1 50	59 14.3	117.3	58 47.3	119.0	58 19.3	120.7	57 49.9	122.3	57 19.3	123.9	1 50
40	61 26.1	119.5	60 56.8	121.3	60 26.3	123.1	59 54.6	124.8	59 21.6	126.4	40
30	63 34.5	122.1	63 02.8	124.0	62 29.7	125.9	61 55.7	127.6	61 19.6	129.3	30
20	65 39.1	125.2	65 04.6	127.2	64 28.5	129.1	63 51.3	130.9	63 12.9	132.6	20
10	67 38.5	128.9	67 00.8	130.9	66 21.8	132.8	65 41.3	134.6	64 59.6	136.4	10
1 00	69 31.5	133.2	68 50.3	135.3	68 07.5	137.2	67 23.7	139.0	66 39.0	140.7	1 00
0 50	71 15.7	138.4	70 30.6	140.4	69 44.5	142.3	68 57.0	144.1	68 08.6	145.6	0 50
40	72 49.3	144.6	72 00.0	146.5	71 09.6	148.2	70 18.6	149.9	69 27.0	151.3	40
30	74 08.0	152.0	73 14.6	153.6	72 21.0	155.1	71 26.3	156.5	70 31.5	157.7	30
20	75 08.6	160.4	74 12.0	161.7	73 14.6	162.8	72 17.3	163.8	71 19.8	164.7	20
10	75 46.8	169.9	74 47.7	170.6	73 48.5	171.2	72 49.2	171.7	71 49.8	172.2	10
0 00	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		12°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	°	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 22.5	105.1	1 17.7	106.1	1 12.9	107.1	1 08.1	108.1	1 03.4	109.1	5 50
40	3 46.8	105.3	3 41.3	106.3	3 35.8	107.3	3 30.3	108.3	3 24.7	109.3	40
30	6 11.0	105.6	6 14.9	106.6	5 58.5	107.6	5 52.2	108.6	5 45.7	109.6	30
20	8 35.0	105.8	8 28.2	106.9	8 21.1	107.9	8 13.9	108.9	8 06.5	109.9	20
10	10 59.0	106.1	10 51.3	107.2	10 43.4	108.2	10 35.4	109.2	10 27.2	110.2	10
5 00	13 22.6	106.5	13 14.1	107.5	13 05.5	108.5	12 56.6	109.5	12 47.5	110.5	5 00
4 50	15 45.9	106.9	15 36.7	107.9	15 27.3	108.9	15 17.4	109.9	15 07.4	110.9	4 50
40	18 09.0	107.2	17 59.0	108.3	17 48.7	109.3	17 38.0	110.3	17 27.0	111.3	40
30	20 31.8	107.6	20 20.9	108.7	20 09.7	109.8	19 58.1	110.8	19 46.2	111.8	30
20	22 54.1	108.1	22 42.5	109.2	22 30.4	110.3	22 17.7	111.3	22 04.8	112.3	20
10	25 16.3	108.6	25 03.6	109.7	24 50.4	110.8	24 36.8	111.9	24 22.9	112.9	10
4 00	27 37.6	109.2	27 24.1	110.3	27 10.0	111.4	26 55.4	112.5	26 40.4	113.6	4 00
3 50	29 58.7	109.9	29 44.2	111.0	29 28.9	112.1	29 13.3	113.2	28 57.2	114.3	3 50
40	32 19.1	110.6	32 03.5	111.7	31 47.3	112.9	31 30.5	114.0	31 13.1	115.1	40
30	34 38.9	111.4	34 22.3	112.5	34 04.8	113.7	33 46.7	114.8	33 27.9	116.0	30
20	36 57.8	112.2	36 40.0	113.4	36 21.3	114.6	36 02.1	115.7	35 42.1	116.9	20
10	39 15.9	113.1	38 56.9	114.3	38 37.0	115.5	38 16.3	116.7	37 55.0	117.9	10
3 00	41 33.1	114.1	41 12.7	115.4	40 51.4	116.6	40 29.3	117.8	40 06.5	119.0	3 00
2 50	43 49.1	115.3	43 27.2	116.6	43 04.4	117.8	42 40.9	119.1	42 16.6	120.3	2 50
40	46 03.7	116.5	45 40.3	117.8	45 16.0	119.1	44 50.8	120.4	44 24.8	121.7	40
30	48 16.7	117.9	47 51.7	119.3	47 25.7	120.6	46 58.8	121.9	46 31.0	123.2	30
20	50 28.0	119.5	50 01.2	120.9	49 33.4	122.2	49 04.7	123.6	48 35.0	124.9	20
10	52 37.0	121.3	52 08.4	122.7	51 38.6	124.1	51 08.0	125.5	50 36.2	126.8	10
2 00	54 43.7	123.2	54 12.9	124.7	53 41.1	126.2	53 08.3	127.6	52 34.4	128.9	2 00
1 50	56 47.4	125.5	56 14.4	127.0	55 40.1	128.5	55 05.0	129.9	54 28.9	131.2	1 50
40	58 47.1	128.0	58 11.7	129.6	57 35.1	131.1	56 57.7	132.5	56 19.0	133.9	40
30	60 42.7	130.9	60 04.6	132.5	59 25.5	134.0	58 45.4	135.5	58 04.2	136.8	30
20	62 32.9	134.2	61 52.1	135.8	61 10.2	137.3	60 27.3	138.7	59 43.5	140.1	20
10	64 16.7	138.0	63 33.0	139.5	62 48.3	141.0	62 02.5	142.4	61 15.7	143.7	10
1 00	65 52.7	142.3	65 05.8	143.8	64 17.9	145.2	63 29.4	146.5	62 40.1	147.8	1 00
0 50	67 19.3	147.2	66 29.3	148.6	65 38.3	149.9	64 46.7	151.1	63 54.9	152.3	0 50
40	68 34.3	152.7	67 41.3	153.9	66 47.6	155.1	65 53.4	156.2	64 58.9	157.2	40
30	69 36.0	158.8	68 40.3	159.8	67 43.9	160.8	66 47.4	161.6	65 50.7	162.5	30
20	70 21.9	165.5	69 23.9	166.2	68 25.6	166.9	67 27.2	167.5	66 28.6	168.1	20
10	70 50.4	172.6	69 50.9	173.0	68 51.3	173.4	67 51.7	173.7	66 52.1	174.0	10
0 00	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 58.5	110.1	0 53.7	111.1	0 48.8	112.1	0 43.9	113.1	0 39.2	114.1	5 50
40	3 18.9	110.3	3 13.1	111.3	3 07.4	112.3	3 01.5	113.3	2 55.6	114.3	40
30	5 39.1	110.6	5 32.5	111.6	5 25.6	112.6	5 18.7	113.6	5 11.2	114.6	30
20	7 59.1	110.9	7 51.5	111.9	7 43.8	112.9	7 35.8	113.9	7 27.8	114.9	20
10	10 18.7	111.2	10 10.2	112.2	10 01.5	113.2	9 52.4	114.2	9 43.3	115.2	10
5 00	12 38.1	111.5	12 28.6	112.5	12 18.8	113.6	12 08.8	114.6	11 58.5	115.6	5 00
4 50	14 57.2	111.9	14 46.6	112.9	14 35.7	114.0	14 24.6	115.0	14 13.2	116.0	4 50
40	17 15.7	112.4	17 04.1	113.4	16 52.3	114.4	16 40.0	115.5	16 27.5	116.5	40
30	19 33.8	112.9	19 21.2	113.9	19 08.2	114.9	18 54.8	116.0	18 41.2	117.0	30
20	21 51.4	113.4	21 37.6	114.5	21 23.6	115.5	21 09.0	116.6	20 54.2	117.6	20
10	24 08.4	114.0	23 53.6	115.1	23 38.2	116.1	23 22.5	117.2	23 06.3	118.2	10
4 00	26 24.7	114.7	26 08.7	115.8	25 52.2	116.8	25 35.2	117.9	25 17.7	118.9	4 00
3 50	28 40.2	115.4	28 23.1	116.5	28 05.2	117.6	27 46.9	118.7	27 28.2	119.7	3 50
40	30 55.0	116.2	30 36.5	117.3	30 17.4	118.4	29 57.8	119.5	29 37.6	120.6	40
30	33 08.7	117.1	32 48.9	118.2	32 28.5	119.3	32 07.4	120.4	31 45.7	121.6	30
20	35 21.5	118.0	35 00.2	119.2	34 38.3	120.3	34 15.8	121.4	33 52.7	122.6	20
10	37 32.9	119.1	37 10.2	120.3	36 46.7	121.4	36 22.7	122.5	35 57.9	123.7	10
3 00	39 42.9	120.3	39 18.7	121.5	38 53.6	122.6	38 28.0	123.7	38 01.6	124.9	3 00
2 50	41 51.3	121.6	41 25.5	122.7	40 58.8	123.9	40 31.4	125.1	40 03.2	126.3	2 50
40	43 58.0	123.0	43 30.3	124.2	43 01.9	125.4	42 32.8	126.6	42 02.8	127.8	40
30	46 02.5	124.5	45 32.9	125.8	45 02.6	127.0	44 31.6	128.2	43 59.8	129.4	30
20	48 04.4	126.2	47 33.0	127.5	47 00.8	128.8	46 27.9	130.0	45 54.1	131.2	20
10	50 03.7	128.1	49 30.2	129.4	48 56.0	130.7	48 20.9	131.9	47 45.0	133.2	10
2 00	51 59.6	130.3	51 24.0	131.6	50 47.7	132.8	50 10.4	134.0	49 32.4	135.3	2 00
1 50	53 51.9	132.6	53 14.0	133.9	52 35.2	135.2	51 55.7	136.4	51 15.5	137.7	1 50
40	55 39.6	135.3	54 59.4	136.6	54 18.4	137.8	53 36.6	139.0	52 53.9	140.3	40
30	57 22.2	138.2	56 39.5	139.5	55 56.0	140.7	55 11.7	141.9	54 26.9	143.1	30
20	58 58.9	141.4	58 13.6	142.7	57 27.5	143.9	56 41.0	145.0	55 53.6	146.2	20
10	60 28.6	145.0	59 40.7	146.2	58 52.2	147.4	58 02.9	148.5	57 13.2	149.6	10
1 00	61 50.1	149.0	60 59.6	150.1	60 08.7	151.2	59 17.2	152.2	58 25.1	153.2	1 00
0 50	63 02.4	153.3	62 09.4	154.4	61 16.1	155.3	60 22.2	156.2	59 27.7	157.1	0 50
40	64 03.9	158.1	63 08.7	159.0	62 13.2	159.8	61 17.4	160.6	60 21.3	161.3	40
30	64 53.5	163.2	63 56.2	163.9	62 59.0	164.5	62 01.3	165.2	61 03.7	165.7	30
20	65 30.1	168.6	64 31.4	169.1	63 32.7	169.6	62 33.8	170.0	61 34.9	170.4	20
10	65 52.5	174.3	64 52.8	174.5	63 53.1	174.7	62 53.4	174.9	61 53.7	175.1	10
0 00	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 05.2	89.0	0 10.4	88.0	0 15.6	87.0	0 20.9	86.0	6 00
5 50	2 29.4	90.2	2 34.7	89.2	2 39.8	88.2	2 45.0	87.2	2 50.0	86.2	5 50
40	4 58.9	90.4	5 04.1	89.4	5 09.1	88.4	5 14.2	87.4	5 19.1	86.4	40
30	7 28.2	90.7	7 33.4	89.6	7 38.4	88.6	7 43.6	87.6	7 48.3	86.6	30
20	9 57.7	90.9	10 02.9	89.9	10 07.9	88.9	10 12.7	87.9	10 17.5	86.8	20
10	12 27.1	91.1	12 32.4	90.1	12 37.3	89.1	12 42.2	88.1	12 46.7	87.0	10
5 00	14 56.5	91.3	15 01.7	90.3	15 06.7	89.3	15 11.4	88.3	15 15.9	87.2	5 00
4 50	17 25.8	91.5	17 31.2	90.5	17 36.2	89.5	17 40.9	88.4	17 45.2	87.4	4 50
40	19 55.2	91.8	20 00.6	90.8	20 05.6	89.7	20 10.2	88.6	20 14.5	87.6	40
30	22 24.6	92.1	22 30.0	91.0	22 35.0	89.9	22 39.7	88.8	22 43.7	87.7	30
20	24 53.9	92.3	24 59.4	91.2	25 04.4	90.1	25 09.0	89.0	25 13.1	87.9	20
10	27 23.2	92.6	27 28.8	91.5	27 33.8	90.3	27 38.5	89.2	27 42.4	88.1	10
4 00	29 52.4	92.9	29 58.2	91.7	30 03.3	90.6	30 07.8	89.4	30 11.8	88.3	4 00
3 50	32 21.6	93.2	32 27.6	92.0	32 32.7	90.8	32 37.3	89.6	32 41.2	88.4	3 50
40	34 50.9	93.5	34 56.8	92.3	35 02.1	91.1	35 06.7	89.9	35 10.6	88.6	40
30	37 20.0	93.8	37 26.2	92.6	37 31.6	91.3	37 36.2	90.1	37 39.9	88.8	30
20	39 49.0	94.2	39 55.4	92.9	40 00.9	91.6	40 05.5	90.3	40 09.4	89.0	20
10	42 18.0	94.6	42 24.7	93.2	42 30.2	91.9	42 35.1	90.5	42 38.8	89.2	10
3 00	44 47.0	95.0	44 53.8	93.6	44 59.6	92.2	45 04.3	90.8	45 08.2	89.4	3 00
2 50	47 15.8	95.4	47 22.9	94.0	47 28.9	92.5	47 33.9	91.0	47 37.6	89.6	2 50
40	49 44.5	95.9	49 51.9	94.4	49 58.2	92.9	50 03.1	91.3	50 07.0	89.8	40
30	52 13.0	96.5	52 20.9	94.9	52 27.3	93.3	52 32.6	91.6	52 36.4	90.0	30
20	54 41.4	97.1	54 49.7	95.4	54 56.5	93.7	55 01.9	91.9	55 05.9	90.2	20
10	57 09.6	97.8	57 18.5	96.0	57 25.6	94.1	57 31.5	92.3	57 35.1	90.4	10
2 00	59 37.5	98.6	59 46.9	96.6	59 54.6	94.7	60 00.5	92.7	60 04.8	90.7	2 00
1 50	62 05.0	99.5	62 15.2	97.4	62 23.5	95.3	62 29.1	93.1	62 34.1	91.0	1 50
40	64 32.2	100.6	64 43.3	98.3	64 52.1	96.0	64 59.0	93.6	65 03.7	91.3	40
30	66 58.8	101.9	67 10.9	99.4	67 20.8	96.8	67 28.0	94.2	67 32.9	91.6	30
20	69 24.5	103.5	69 38.2	100.7	69 48.9	97.9	69 57.0	95.0	70 02.4	92.0	20
10	71 49.2	105.5	72 04.5	102.3	72 16.6	99.1	72 26.0	95.9	72 31.5	92.6	10
1 00	74 12.5	108.0	74 30.0	104.5	74 43.9	100.8	74 54.2	97.1	75 01.0	93.2	1 00
0 50	76 32.9	111.5	76 53.8	107.4	77 10.0	103.1	77 22.5	98.6	77 30.0	94.1	0 50
40	78 49.8	116.3	79 14.6	111.5	79 34.6	106.4	79 49.6	101.0	79 58.9	95.3	40
30	80 59.7	123.5	81 30.5	117.9	81 56.0	111.6	82 15.5	104.7	82 27.2	97.3	30
20	82 56.0	134.9	83 36.1	128.6	84 10.6	120.8	84 37.6	111.7	84 55.0	101.1	20
10	84 24.7	153.4	85 17.1	148.0	86 05.9	140.2	86 48.2	128.6	87 18.0	111.8	10
0 00	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 26.1	85.0	0 31.3	84.0	0 36.5	83.0	0 41.7	82.0	0 46.9	81.0	6 00
5 50	2 55.1	85.2	3 00.0	84.2	3 04.9	83.2	3 09.7	82.2	3 14.5	81.2	5 50
40	5 23.9	85.4	5 28.7	84.4	5 33.2	83.4	5 37.8	82.4	5 42.2	81.4	40
30	7 52.9	85.6	7 57.4	84.6	8 01.9	83.6	8 05.9	82.6	8 10.0	81.6	30
20	10 21.9	85.8	10 26.2	84.8	10 30.3	83.8	10 34.2	82.8	10 37.9	81.8	20
10	12 51.1	86.0	12 55.1	85.0	12 58.9	84.0	13 02.5	82.9	13 05.8	81.9	10
5 00	15 20.0	86.2	15 23.9	85.2	15 27.4	84.1	15 30.8	83.1	15 33.8	82.0	5 00
4 50	17 49.2	86.4	17 52.8	85.3	17 56.2	84.2	17 59.2	83.2	18 01.8	82.1	4 50
40	20 18.3	86.5	20 21.7	85.4	20 24.8	84.4	20 27.5	83.4	20 29.8	82.2	40
30	22 47.5	86.7	22 50.7	85.6	22 53.6	84.5	22 55.9	83.5	22 57.9	82.3	30
20	25 16.6	86.8	25 19.7	85.7	25 22.3	84.6	25 24.4	83.5	25 26.0	82.4	20
10	27 45.9	87.0	27 48.7	85.8	27 51.1	84.7	27 52.9	83.6	27 54.2	82.4	10
4 00	30 15.1	87.1	30 17.8	86.0	30 19.8	84.8	30 21.4	83.7	30 22.3	82.5	4 00
3 50	32 44.4	87.2	32 46.9	86.1	32 48.8	84.9	32 49.8	83.7	32 50.4	82.5	3 50
40	35 13.6	87.4	35 16.0	86.2	35 17.5	85.0	35 18.5	83.7	35 18.6	82.5	40
30	37 42.9	87.5	37 45.0	86.3	37 46.5	85.0	37 47.0	83.8	37 46.8	82.4	30
20	40 12.2	87.7	40 14.2	86.4	40 15.3	85.1	40 15.5	83.8	40 14.8	82.4	20
10	42 41.5	87.8	42 43.3	86.5	42 44.3	85.1	42 44.2	83.7	42 42.9	82.4	10
3 00	45 10.9	87.9	45 12.5	86.5	45 13.0	85.1	45 12.6	83.7	45 11.1	82.3	3 00
2 50	47 40.2	88.0	47 41.6	86.6	47 42.0	85.1	47 40.1	83.6	47 39.0	82.1	2 50
40	50 09.6	88.2	50 10.8	86.6	50 10.7	85.1	50 09.6	83.5	50 07.1	81.9	40
30	52 38.9	88.3	52 40.0	86.7	52 39.8	85.0	52 38.0	83.4	52 35.0	81.7	30
20	55 08.3	88.4	55 09.1	86.7	55 08.5	84.9	55 06.4	83.2	55 02.9	81.4	20
10	57 37.6	88.5	57 38.4	86.7	57 37.4	84.8	57 34.6	83.0	57 30.6	81.1	10
2 00	60 07.1	88.7	60 07.5	86.7	60 06.1	84.7	60 03.1	82.7	59 58.2	80.7	2 00
1 50	62 36.4	88.8	62 36.6	86.6	62 35.0	84.4	62 31.1	82.3	62 25.4	80.1	1 50
40	65 05.9	88.9	65 05.8	86.5	65 03.5	84.2	64 59.2	81.8	64 52.6	79.4	40
30	67 35.2	89.0	67 34.9	86.4	67 32.4	83.8	67 26.8	81.2	67 19.0	78.6	30
20	70 04.6	89.1	70 04.1	86.2	70 00.6	83.3	69 54.6	80.4	69 45.5	77.5	20
10	72 34.0	89.2	72 33.2	85.9	72 29.2	82.6	72 21.4	79.3	72 11.8	76.1	10
1 00	75 03.5	89.4	75 02.2	85.5	74 56.9	81.6	74 48.0	77.8	74 35.3	74.1	1 00
0 50	77 32.7	89.5	77 31.0	84.9	77 24.7	80.3	77 13.0	75.8	76 58.0	71.4	0 50
40	80 02.3	89.6	79 59.8	83.8	79 01.4	78.1	79 37.5	72.7	79 18.1	67.5	40
30	82 31.7	89.7	82 28.0	82.1	82 17.0	74.6	81 58.0	67.7	81 33.0	61.3	30
20	85 01.1	89.8	84 55.4	78.4	84 38.4	67.8	84 11.8	58.6	83 37.6	50.8	20
10	87 30.5	89.9	87 19.0	68.0	86 48.6	51.1	86 06.3	39.5	85 17.6	31.7	10
0 00	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 52.2	80.0	0 57.1	79.1	1 02.3	78.1	1 07.4	77.1	1 12.5	76.1	6 00
5 50	3 19.4	80.2	3 24.0	79.2	3 28.6	78.2	3 33.1	77.2	3 37.6	76.3	5 50
40	5 46.6	80.4	5 50.7	79.4	5 54.9	78.4	5 58.9	77.4	6 02.8	76.4	40
30	8 14.0	80.6	8 17.7	79.6	8 21.4	78.6	8 24.7	77.6	8 28.1	76.6	30
20	10 41.3	80.7	10 44.7	79.7	10 47.8	78.7	10 50.7	77.7	10 53.4	76.7	20
10	13 09.0	80.9	13 11.7	79.8	13 14.4	78.8	13 16.8	77.8	13 18.9	76.7	10
5 00	15 36.5	81.0	15 38.9	80.0	15 41.0	78.9	15 42.9	77.9	15 44.4	76.9	5 00
4 50	18 04.2	81.1	18 06.0	80.0	18 07.8	79.0	18 09.0	77.9	18 09.9	76.9	4 50
40	20 31.7	81.2	20 33.2	80.1	20 34.3	79.0	20 35.1	78.0	20 35.4	76.9	40
30	22 59.4	81.2	23 00.5	80.2	23 01.1	79.1	23 01.3	78.0	23 00.9	76.9	30
20	25 27.1	81.3	25 27.6	80.2	25 27.7	79.1	25 27.4	78.0	25 26.5	76.9	20
10	27 54.8	81.3	27 54.8	80.2	27 54.5	79.1	27 53.5	77.9	27 51.9	76.8	10
4 00	30 22.5	81.3	30 22.2	80.2	30 21.2	79.0	30 19.7	77.8	30 17.4	76.7	4 00
3 50	32 50.4	81.3	32 49.4	80.1	32 47.9	78.9	32 45.7	77.7	32 42.8	76.6	3 50
40	35 18.0	81.3	35 16.5	80.1	35 14.4	78.8	35 11.7	77.6	35 08.3	76.4	40
30	37 45.7	81.2	37 43.8	79.9	37 41.1	78.7	37 37.5	77.4	37 33.3	76.2	30
20	40 13.3	81.1	40 10.8	79.8	40 07.5	78.5	40 03.4	77.2	39 58.3	75.9	20
10	42 41.0	81.0	42 37.9	79.6	42 34.0	78.3	42 29.0	76.9	42 23.2	75.6	10
3 00	45 08.5	80.8	45 04.8	79.4	45 00.2	78.0	44 54.5	76.6	44 47.7	75.2	3 00
2 50	47 36.0	80.6	47 31.6	79.1	47 26.2	77.7	47 19.7	76.2	47 12.1	74.8	2 50
40	50 03.3	80.4	49 58.3	78.8	49 52.1	77.3	49 44.7	75.8	49 36.1	74.2	40
30	52 30.7	80.1	52 24.9	78.4	52 17.8	76.8	52 09.4	75.2	51 59.6	73.6	30
20	54 57.7	79.7	54 51.1	78.0	54 43.1	76.2	54 33.6	74.5	54 22.8	72.9	20
10	57 24.7	79.2	57 17.1	77.4	57 08.0	75.6	56 57.3	73.8	56 45.1	72.0	10
2 00	59 51.3	78.7	59 42.6	76.7	59 32.4	74.8	59 20.5	72.8	59 06.9	70.9	2 00
1 50	62 17.9	78.0	62 08.0	75.9	61 56.3	73.8	61 42.9	71.6	61 27.5	69.7	1 50
40	64 43.5	77.1	64 32.4	74.8	64 19.3	72.6	64 04.3	70.3	63 47.1	68.2	40
30	67 09.1	76.1	66 56.4	73.5	66 41.2	71.1	66 24.1	68.7	66 04.7	66.3	30
20	69 33.5	74.7	69 18.8	71.9	69 01.8	69.2	68 42.5	66.6	68 20.5	64.1	20
10	71 57.0	72.9	71 40.2	69.8	71 20.7	66.8	70 58.1	64.0	70 33.0	61.2	10
1 00	74 18.9	70.5	73 59.1	67.1	73 36.3	63.8	73 10.7	60.6	72 42.0	57.6	1 00
0 50	76 38.4	67.3	76 15.0	63.4	75 48.0	59.8	75 18.0	56.2	74 44.7	53.0	0 50
40	78 54.0	62.7	78 25.5	58.2	77 53.3	54.2	77 17.9	50.3	76 39.3	46.9	40
30	81 03.0	55.7	80 27.5	50.6	79 48.5	46.4	79 06.0	42.3	78 21.0	38.9	30
20	82 57.5	44.5	82 13.2	39.2	81 25.9	34.9	80 35.9	31.3	79 44.6	28.3	20
10	84 25.2	26.2	83 30.6	22.3	82 34.7	19.3	81 37.7	17.0	80 40.2	15.1	10
0 00	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 17.6	75.1	1 22.6	74.1	1 27.6	73.1	1 32.6	72.1	1 37.6	71.1	6 00
5 50	3 42.0	75.3	3 46.4	74.3	3 50.6	73.3	3 54.8	72.3	3 59.1	71.3	5 50
40	6 06.6	75.4	6 10.2	74.4	6 13.7	73.4	6 17.2	72.4	6 20.5	71.4	40
30	8 31.3	75.6	8 34.2	74.5	8 37.0	73.5	8 39.7	72.5	8 42.2	71.5	30
20	10 56.0	75.7	10 58.2	74.6	11 00.3	73.6	11 02.3	72.6	11 04.0	71.6	20
10	13 20.8	75.7	13 22.4	74.7	13 23.7	73.7	13 24.8	72.7	13 25.8	71.6	10
5 00	15 45.6	75.8	15 46.5	74.8	15 47.1	73.7	15 47.5	72.7	15 47.6	71.7	5 00
4 50	18 10.5	75.8	18 10.7	74.8	18 10.6	73.7	18 10.2	72.7	18 09.4	71.6	4 50
40	20 35.4	75.8	20 34.9	74.8	20 34.0	73.7	20 32.8	72.6	20 31.2	71.6	40
30	23 00.2	75.8	22 59.1	74.7	22 57.4	73.6	22 55.4	72.5	22 52.9	71.5	30
20	25 25.1	75.7	25 23.2	74.7	25 20.7	73.5	25 17.9	72.4	25 14.6	71.3	20
10	27 50.4	75.6	27 47.2	74.6	27 44.0	73.4	27 40.2	72.3	27 36.1	71.1	10
4 00	30 14.7	75.5	30 11.2	74.4	30 07.1	73.2	29 02.6	72.1	29 57.3	70.9	4 00
3 50	32 39.3	75.4	32 35.1	74.2	32 30.2	73.0	32 24.6	71.8	32 18.4	70.6	3 50
40	35 03.8	75.2	34 58.7	74.0	34 53.0	72.7	34 46.5	71.5	34 39.3	70.3	40
30	37 28.2	74.9	37 22.3	73.7	37 15.6	72.4	37 08.0	71.2	36 59.8	69.9	30
20	39 52.4	74.6	39 45.5	73.3	39 37.8	72.0	39 29.3	70.8	39 20.0	69.5	20
10	42 16.4	74.2	42 08.6	72.9	41 59.7	71.6	41 50.2	70.2	41 39.7	68.9	10
3 00	44 40.0	73.8	44 31.1	72.4	44 21.3	71.0	44 10.6	69.7	43 58.9	68.3	3 00
2 50	47 03.3	73.3	46 53.4	71.9	46 42.5	70.4	46 30.3	69.0	46 17.4	67.6	2 50
40	49 26.3	72.7	49 15.0	71.2	49 02.9	69.7	48 49.5	68.2	48 35.1	66.7	40
30	51 48.6	72.0	51 36.3	70.4	51 22.6	68.9	51 07.9	67.3	50 51.7	65.8	30
20	54 10.5	71.2	53 56.6	69.5	53 41.5	67.9	53 25.3	66.3	53 07.6	64.7	20
10	56 31.4	70.2	56 16.0	68.5	55 59.5	66.7	55 41.3	65.0	55 21.9	63.4	10
2 00	58 51.6	69.0	58 34.5	67.2	58 16.0	65.4	57 56.1	63.6	57 34.7	61.9	2 00
1 50	61 10.4	67.7	60 51.5	65.7	60 31.0	63.8	60 08.7	61.9	59 45.1	60.1	1 50
40	63 28.0	66.0	63 06.6	64.0	62 44.0	61.9	62 19.6	59.9	61 53.5	58.0	40
30	65 43.3	64.0	65 19.7	61.8	64 54.4	59.7	64 27.3	57.6	63 58.5	55.6	30
20	67 56.4	61.6	67 29.8	59.2	67 01.6	57.0	66 31.5	54.8	65 59.6	52.6	20
10	70 06.0	58.5	69 36.3	56.0	69 04.5	53.6	68 31.0	51.4	67 55.7	49.2	10
1 00	72 11.0	54.8	71 37.3	52.1	71 01.7	49.6	70 24.3	47.2	69 45.1	45.0	1 00
0 50	74 09.3	50.0	73 31.3	47.2	72 51.3	44.6	72 09.5	42.2	71 26.2	40.0	0 50
40	75 58.7	43.8	75 15.3	41.0	74 30.5	38.4	73 44.1	36.1	72 56.5	34.0	40
30	77 34.3	35.9	76 45.5	33.2	75 55.7	30.9	75 04.5	28.8	74 12.2	27.0	30
20	78 51.3	25.8	77 57.2	23.7	77 02.3	21.8	76 06.6	20.2	75 10.5	18.8	20
10	79 42.1	13.6	78 43.8	12.4	77 45.2	11.3	76 46.4	10.5	75 47.4	9.7	10
0 00	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 42.5	70.1	1 47.4	69.1	1 52.3	68.1	1 57.1	67.1	2 01.9	66.1	6 00
5 50	4 03.1	70.2	4 07.1	69.2	4 11.0	68.2	4 14.8	67.2	4 18.6	66.2	5 50
40	6 23.8	70.4	6 26.8	69.4	6 29.8	68.4	6 32.7	67.4	6 35.5	66.4	40
30	8 44.5	70.5	8 46.7	69.5	8 48.7	68.5	8 50.6	67.5	8 52.4	66.4	30
20	11 05.4	70.6	11 06.7	69.6	11 07.8	68.5	11 08.8	67.5	11 09.4	66.5	20
10	12 26.3	70.6	13 26.8	69.6	13 26.8	68.5	13 26.8	67.5	13 26.5	66.5	10
5 00	15 47.4	70.6	15 46.7	69.6	15 45.9	68.5	15 44.9	67.5	15 43.4	66.5	5 00
4 50	18 08.2	70.6	18 06.7	69.5	18 04.9	68.5	18 02.8	67.4	18 00.4	66.4	4 50
40	20 29.2	70.5	20 26.7	69.4	20 23.9	68.4	20 20.8	67.3	20 17.2	66.2	40
30	22 49.9	70.4	22 46.6	69.3	22 42.8	68.2	22 38.6	67.1	22 33.8	66.0	30
20	25 10.7	70.2	25 06.3	69.1	25 01.4	68.0	24 56.2	66.9	24 50.3	65.8	20
10	27 31.2	70.0	27 25.8	68.9	27 19.9	67.8	27 13.5	66.7	27 06.4	65.5	10
4 00	29 51.6	69.8	29 45.1	68.6	29 38.1	67.5	29 30.5	66.4	29 22.4	65.2	4 00
3 50	32 11.5	69.5	32 04.2	68.3	31 55.9	67.1	31 47.2	66.0	31 37.7	64.8	3 50
40	34 31.4	69.1	34 22.7	67.9	34 13.4	66.7	34 03.5	65.5	33 52.8	64.4	40
30	36 50.8	68.7	36 41.0	67.5	36 30.5	66.2	36 19.2	65.0	36 07.1	63.8	30
20	39 09.8	68.2	38 58.7	66.9	38 46.9	65.7	38 34.3	64.4	38 20.9	63.2	20
10	41 28.2	67.6	41 16.0	66.3	41 02.8	65.0	40 48.7	63.7	40 33.8	62.5	10
3 00	43 46.1	66.9	43 32.3	65.6	43 17.7	64.3	43 02.2	63.0	42 45.8	61.6	3 00
2 50	46 03.1	66.2	45 48.0	64.8	45 31.8	63.4	45 14.7	62.1	44 56.7	60.7	2 50
40	48 19.4	65.3	48 02.6	63.8	47 44.9	62.4	47 26.2	61.0	47 06.4	59.6	40
30	50 34.6	64.3	50 16.2	62.8	49 56.7	61.3	49 36.2	59.8	49 14.5	58.4	30
20	52 48.6	63.1	52 28.3	61.5	52 07.0	60.0	51 44.5	58.5	51 20.8	57.0	20
10	55 01.0	61.7	54 38.7	60.1	54 14.4	58.5	53 50.7	57.0	53 24.9	55.4	10
2 00	57 11.6	60.1	56 47.2	58.5	56 21.7	56.8	55 54.9	55.2	55 26.8	53.6	2 00
1 50	59 20.1	58.2	58 53.4	56.5	58 25.4	54.8	57 56.0	53.1	57 25.5	51.5	1 50
40	61 25.7	56.1	60 56.4	54.3	60 25.9	52.6	59 54.0	50.9	59 20.8	49.2	40
30	63 27.9	53.6	62 55.9	51.7	62 22.5	49.9	61 47.6	48.2	61 11.5	46.5	30
20	65 26.0	50.6	64 50.6	48.7	64 14.3	46.9	63 36.4	45.1	62 57.2	43.4	20
10	67 18.4	47.0	66 40.0	45.1	66 00.1	43.3	65 19.1	41.5	64 36.5	39.9	10
1 00	69 04.3	42.9	68 22.0	41.0	67 38.5	39.1	66 54.0	37.4	66 08.6	35.8	1 00
0 50	70 41.4	37.9	69 55.2	36.1	69 07.9	34.3	68 19.7	32.7	67 30.5	31.1	0 50
40	72 07.3	32.1	71 17.0	30.4	70 26.2	28.8	69 34.5	27.3	68 42.1	25.9	40
30	73 19.0	25.3	72 25.2	23.8	71 30.7	22.4	70 36.0	21.2	69 40.2	20.1	30
20	74 13.8	17.5	73 16.8	16.4	72 19.5	15.4	71 22.0	14.5	70 24.1	13.7	20
10	74 48.2	9.0	73 49.0	8.4	72 49.7	7.9	71 50.3	7.4	70 50.9	7.0	10
0 00	75 0.0	0.0	74 0.0	0.0	73 0.0	0.0	72 0.0	0.0	71 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 29. 4	90. 2	2 24. 2	91. 2	2 18. 9	92. 2	2 13. 6	93. 2	2 08. 2	94. 2	5 50
40	4 58. 9	90. 4	4 53. 6	91. 4	4 48. 1	92. 4	4 42. 7	93. 4	4 37. 2	94. 4	40
30	7 28. 2	90. 7	7 22. 9	91. 7	7 17. 4	92. 7	7 11. 9	93. 7	7 06. 1	94. 7	30
20	9 57. 7	90. 9	9 52. 3	91. 9	9 46. 7	92. 9	9 40. 9	93. 9	9 35. 0	94. 9	20
10	12 27. 1	91. 1	12 21. 7	92. 1	12 15. 9	93. 2	12 10. 0	94. 2	12 03. 9	95. 2	10
5 00	14 56. 5	91. 3	14 50. 9	92. 4	14 45. 1	93. 4	14 39. 0	94. 4	14 32. 7	95. 5	5 00
4 50	17 25. 8	91. 5	17 20. 2	92. 7	17 14. 2	93. 7	17 08. 0	94. 7	17 01. 6	95. 8	4 50
40	19 55. 2	91. 8	19 49. 5	92. 9	19 43. 3	93. 9	19 36. 8	95. 0	19 30. 0	96. 1	40
30	22 24. 6	92. 1	22 18. 7	93. 2	22 12. 4	94. 2	22 05. 7	95. 3	21 58. 5	96. 4	30
20	24 53. 9	92. 3	24 47. 9	93. 4	24 41. 4	94. 5	24 34. 4	95. 6	24 27. 0	96. 7	20
10	27 23. 2	92. 6	27 17. 0	93. 7	27 10. 3	94. 8	27 03. 1	95. 9	26 55. 3	97. 1	10
4 00	29 52. 4	92. 9	29 46. 1	94. 0	29 39. 2	95. 2	29 31. 7	96. 3	29 23. 6	97. 5	4 00
3 50	32 21. 6	93. 2	32 15. 2	94. 3	32 07. 9	95. 5	32 00. 2	96. 7	31 51. 8	97. 9	3 50
40	34 50. 9	93. 5	34 44. 1	94. 7	34 36. 7	95. 9	34 28. 5	97. 1	34 19. 7	98. 3	40
30	37 20. 0	93. 8	37 13. 0	95. 1	37 05. 2	96. 3	36 56. 8	97. 5	36 47. 4	98. 8	30
20	39 49. 0	94. 2	39 41. 8	95. 5	39 33. 7	96. 8	39 24. 8	98. 0	39 15. 0	99. 3	20
10	42 18. 0	94. 6	42 10. 5	95. 9	42 02. 0	97. 2	41 52. 7	98. 5	41 42. 3	99. 9	10
3 00	44 47. 0	95. 0	44 39. 1	96. 4	44 30. 1	97. 8	44 20. 2	99. 1	44 09. 4	100. 5	3 00
2 50	47 15. 8	95. 4	47 07. 5	96. 9	46 58. 1	98. 3	46 47. 7	99. 8	46 36. 1	101. 2	2 50
40	49 44. 5	95. 9	49 35. 7	97. 5	49 25. 8	99. 0	49 14. 7	100. 5	49 02. 6	102. 0	40
30	52 13. 0	96. 5	52 03. 9	98. 1	51 53. 8	99. 7	51 41. 5	101. 3	51 28. 4	102. 9	30
20	54 41. 4	97. 1	54 31. 6	98. 8	54 20. 4	100. 5	54 07. 8	102. 2	53 53. 9	103. 8	20
10	57 09. 6	97. 8	56 59. 1	99. 6	56 47. 1	101. 4	56 33. 8	103. 2	56 18. 5	104. 9	10
2 00	59 37. 5	98. 6	59 26. 3	100. 5	59 13. 3	102. 4	58 58. 8	104. 3	58 42. 7	106. 2	2 00
1 50	62 05. 0	99. 5	61 53. 0	101. 6	61 39. 0	103. 7	61 23. 1	105. 7	61 05. 5	107. 7	1 50
40	64 32. 2	100. 6	64 19. 0	102. 8	64 03. 7	105. 1	63 46. 5	107. 3	63 27. 4	109. 3	40
30	66 58. 8	101. 9	66 44. 2	104. 3	66 27. 5	106. 8	66 08. 4	109. 1	65 47. 2	111. 4	30
20	69 24. 5	103. 5	69 08. 5	106. 2	68 49. 7	108. 8	68 28. 6	111. 4	68 05. 4	113. 9	20
10	71 49. 2	105. 5	71 31. 0	108. 5	71 10. 0	111. 4	70 46. 4	114. 2	70 20. 1	116. 9	10
1 00	74 12. 5	108. 0	73 51. 7	111. 4	73 27. 6	114. 7	73 00. 8	117. 8	72 31. 4	120. 7	1 00
0 50	76 32. 9	111. 5	76 09. 0	115. 3	75 41. 0	119. 0	75 10. 0	122. 4	74 36. 5	125. 6	0 50
40	78 49. 8	116. 3	78 20. 8	120. 7	77 48. 1	124. 8	77 12. 0	128. 5	76 33. 4	131. 8	40
30	80 59. 7	123. 5	80 24. 0	128. 5	79 44. 5	132. 9	79 02. 0	136. 7	78 17. 2	140. 1	30
20	82 56. 0	134. 9	82 11. 5	140. 1	81 23. 9	144. 4	80 34. 0	147. 9	79 42. 5	150. 9	20
10	84 24. 7	153. 4	83 30. 1	157. 3	82 34. 0	160. 3	81 37. 2	162. 6	80 39. 6	164. 5	10
0 00	85 0. 0	180. 0	84 0. 0	180. 0	83 0. 0	180. 0	82 0. 0	180. 0	81 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	2 02.8	95.2	1 57.3	96.2	1 51.7	97.2	1 46.2	98.2	1 40.7	99.2	5 50
40	4 31.5	95.4	4 25.8	96.4	4 19.9	97.4	4 14.1	98.4	4 08.2	99.4	40
30	7 00.2	95.7	6 54.3	96.7	6 48.1	97.7	6 41.8	98.7	6 35.5	99.7	30
20	9 28.9	95.9	9 22.6	96.9	9 16.1	98.0	9 09.6	99.0	9 02.8	100.0	20
10	11 57.6	96.2	11 50.9	97.2	11 44.1	98.3	11 37.2	99.3	11 29.9	100.3	10
5 00	14 26.0	96.5	14 19.1	97.5	14 11.9	98.5	14 04.5	99.6	13 56.8	100.6	5 00
4 50	16 54.4	96.8	16 47.2	97.8	16 39.7	98.8	16 31.8	99.9	16 23.7	100.9	4 50
40	19 22.8	97.1	19 15.2	98.2	19 07.2	99.2	18 58.9	100.3	18 50.3	101.3	40
30	21 51.0	97.4	21 43.0	98.5	21 34.6	99.6	21 25.8	100.6	21 16.7	101.7	30
20	24 19.1	97.8	24 10.7	98.9	24 01.9	100.0	23 52.7	101.0	23 43.0	102.1	20
10	26 47.1	98.2	26 38.2	99.3	26 29.0	100.4	26 19.2	101.5	26 09.0	102.6	10
4 00	29 15.0	98.6	29 05.7	99.7	28 55.8	100.9	28 45.5	102.0	28 34.6	103.1	4 00
3 50	31 42.7	99.0	31 32.9	100.2	31 22.5	101.3	31 11.5	102.5	31 00.0	103.6	3 50
40	34 10.1	99.5	33 59.9	100.7	33 48.8	101.9	33 37.3	103.1	33 25.1	104.2	40
30	36 37.4	100.0	36 26.5	101.3	36 15.0	102.5	36 02.7	103.7	35 49.7	104.9	30
20	39 04.4	100.6	38 52.9	101.9	38 40.7	103.1	38 27.7	104.4	38 13.8	105.6	20
10	41 31.1	101.2	41 19.0	102.6	41 06.0	103.8	40 52.2	105.1	40 37.3	106.4	10
3 00	43 57.6	101.9	43 44.7	103.3	43 30.9	104.6	43 16.2	105.9	43 00.6	107.2	3 00
2 50	46 23.5	102.7	46 09.9	104.1	45 55.3	105.4	45 39.6	106.8	45 22.8	108.2	2 50
40	48 49.2	103.5	48 34.6	104.9	48 18.9	106.4	48 02.2	107.8	47 44.5	109.2	40
30	51 14.1	104.4	50 58.6	105.9	50 41.9	107.5	50 23.9	109.0	50 05.0	110.4	30
20	53 38.6	105.5	53 21.9	107.1	53 04.0	108.7	52 44.8	110.2	52 24.5	111.7	20
10	56 02.1	106.7	55 44.4	108.3	55 24.9	110.0	55 04.3	111.7	54 42.4	113.3	10
2 00	58 24.9	108.0	58 05.5	109.8	57 44.6	111.6	57 22.5	113.3	56 58.9	115.0	2 00
1 50	60 46.2	109.6	60 25.2	111.5	60 02.7	113.4	59 38.6	115.2	59 13.3	117.0	1 50
40	63 06.3	111.5	62 43.4	113.5	62 18.8	115.5	61 52.7	117.4	61 25.1	119.3	40
30	65 24.2	113.7	64 59.1	115.8	64 32.4	117.9	64 03.7	120.0	63 33.6	121.9	30
20	67 39.7	116.3	67 12.2	118.6	66 42.5	120.8	66 11.4	123.0	65 38.4	125.0	20
10	69 51.8	119.5	69 21.2	122.0	68 48.6	124.3	68 13.0	126.6	67 34.0	128.7	10
1 00	71 59.4	123.5	71 25.1	126.1	70 48.7	128.6	70 10.8	130.9	69 31.1	133.1	1 00
0 50	74 00.2	128.5	73 21.6	131.3	72 41.3	133.8	71 59.0	136.1	71 15.5	138.3	0 50
40	75 52.0	134.9	75 08.7	137.6	74 23.5	140.2	73 36.9	142.5	72 49.0	144.5	40
30	77 30.0	143.0	76 41.5	145.6	75 51.3	148.0	75 00.0	150.0	74 07.5	151.9	30
20	78 49.3	153.4	77 55.2	155.5	77 00.3	157.4	76 04.6	159.0	75 08.5	160.4	20
10	79 41.6	166.0	78 43.2	167.2	77 44.6	168.2	76 45.8	169.1	75 46.8	169.9	10
0 00	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 35.2	100.2	1 29.5	101.2	1 23.9	102.2	1 18.2	103.2	1 12.6	104.2	5 50
40	4 02.1	100.4	3 56.0	101.4	3 49.8	102.4	3 43.6	103.4	3 37.3	104.4	40
30	6 29.0	100.7	6 22.4	101.7	6 15.7	102.7	6 08.9	103.7	5 59.2	104.7	30
20	8 55.8	101.0	8 48.6	102.0	8 41.3	103.0	8 34.0	104.0	8 26.3	105.0	20
10	11 22.4	101.3	11 14.7	102.3	11 06.9	103.3	10 59.0	104.3	10 50.7	105.3	10
5 00	13 48.9	101.6	13 40.7	102.6	13 32.2	103.6	13 23.6	104.6	13 14.6	105.7	5 00
4 50	16 15.2	101.9	16 06.4	103.0	15 57.4	104.0	15 48.1	105.0	15 38.4	106.1	4 50
40	18 41.2	102.3	18 31.9	103.4	18 22.1	104.4	18 12.2	105.4	18 01.8	106.5	40
30	21 07.2	102.7	20 57.2	103.8	20 46.8	104.9	20 36.1	105.9	20 24.9	107.0	30
20	23 32.8	103.2	23 22.1	104.3	23 10.9	105.3	22 59.6	106.4	22 47.6	107.5	20
10	25 58.1	103.7	25 46.8	104.8	25 35.0	105.9	25 22.7	106.9	25 09.9	108.0	10
4 00	28 23.1	104.2	28 11.1	105.3	27 58.4	106.4	27 45.5	107.5	27 31.8	108.6	4 00
3 50	30 47.8	104.8	30 35.0	105.9	30 21.6	107.1	30 07.7	108.2	29 53.2	109.3	3 50
40	33 12.1	105.4	32 58.4	106.6	32 44.1	107.7	32 29.4	108.9	32 13.8	110.0	40
30	35 35.9	106.1	35 21.5	107.3	35 06.3	108.5	34 50.4	109.7	34 34.0	110.8	30
20	37 59.2	106.8	37 43.8	108.0	37 27.6	109.3	37 10.8	110.5	36 53.2	111.7	20
10	40 21.9	107.7	40 05.5	108.9	39 48.4	110.2	39 30.4	111.4	39 11.7	112.7	10
3 00	42 44.0	108.6	42 26.5	109.8	42 08.2	111.1	41 49.0	112.4	41 29.0	113.7	3 00
2 50	45 05.2	109.6	44 46.6	110.9	44 27.1	112.2	44 06.3	113.5	43 45.3	114.8	2 50
40	47 25.6	110.7	47 05.6	112.0	46 44.7	113.4	46 23.0	114.8	46 00.2	116.1	40
30	49 44.8	112.0	49 23.5	113.4	49 01.2	114.8	48 37.9	116.2	48 13.6	117.6	30
20	52 02.8	113.3	51 39.9	114.8	51 16.0	116.3	50 51.1	117.7	50 25.2	119.1	20
10	54 19.1	114.9	53 54.8	116.4	53 29.1	118.0	53 02.3	119.5	52 34.5	121.0	10
2 00	56 33.8	116.7	56 07.3	118.3	55 39.8	119.9	55 11.2	121.4	54 41.4	122.9	2 00
1 50	58 46.3	118.7	58 17.7	120.4	57 48.0	122.1	57 17.1	123.6	56 45.1	125.2	1 50
40	60 55.7	121.1	60 24.9	122.8	60 52.9	124.5	59 19.9	126.2	58 45.4	127.8	40
30	63 01.9	123.8	62 28.6	125.6	61 54.0	127.4	61 18.3	129.1	60 41.1	130.7	30
20	65 03.8	127.0	64 27.6	128.8	63 50.0	130.6	63 11.6	132.4	62 31.6	134.0	20
10	67 00.0	130.7	66 20.8	132.6	65 40.5	134.4	64 58.6	136.2	64 15.6	137.8	10
1 00	68 49.7	135.1	68 06.9	137.0	67 22.9	138.8	66 38.1	140.5	65 51.9	142.1	1 00
0 50	70 30.2	140.3	69 43.8	142.2	68 56.4	143.9	68 08.0	145.5	67 18.5	147.0	0 50
40	71 59.7	146.4	71 09.3	148.2	70 18.2	149.8	69 26.5	151.2	68 33.9	152.5	40
30	73 14.6	153.5	72 20.8	155.0	71 26.3	156.4	70 31.2	157.6	69 35.5	158.7	30
20	74 11.6	161.6	73 14.6	162.7	72 17.2	163.7	71 19.7	164.6	70 21.8	165.4	20
10	74 47.7	170.6	73 48.5	171.2	72 49.1	171.7	71 49.8	172.2	70 50.3	172.6	10
0 00	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 06.8	105.2	1 01.1	106.2	0 55.3	107.2	0 49.5	108.1	0 43.7	109.1	5 50
40	3 30.9	105.4	3 24.4	106.4	3 17.9	107.4	3 11.4	108.4	3 04.8	109.4	40
30	5 54.9	105.7	5 47.7	106.7	5 40.4	107.7	5 33.0	108.7	5 25.5	109.7	30
20	8 18.7	106.0	8 10.7	107.0	8 02.6	108.0	7 54.5	109.0	7 46.2	110.0	20
10	10 42.3	106.3	10 33.5	107.3	10 24.7	108.3	10 15.6	109.3	10 06.5	110.3	10
5 00	13 05.5	106.7	12 56.0	107.7	12 46.3	108.7	12 36.5	109.7	12 26.4	110.7	5 00
4 50	15 28.5	107.1	15 18.3	108.1	15 07.7	109.1	14 56.9	110.1	14 45.9	111.1	4 50
40	17 51.1	107.5	17 40.0	108.6	17 28.6	109.6	17 17.0	110.6	17 05.1	111.6	40
30	20 13.4	108.0	20 01.4	109.1	19 49.3	110.1	19 36.7	111.1	19 23.6	112.1	30
20	22 35.3	108.5	22 22.5	109.6	21 09.3	110.6	21 55.8	111.7	21 41.8	112.7	20
10	24 56.8	109.1	24 43.0	110.2	24 28.9	111.2	24 14.3	112.3	23 59.3	113.3	10
4 00	27 17.7	109.7	27 03.0	110.8	26 47.8	111.9	26 32.2	113.0	26 16.1	114.0	4 00
3 50	29 38.1	110.4	29 22.4	111.5	29 06.2	112.6	28 49.4	113.7	28 32.1	114.8	3 50
40	31 57.8	111.1	31 41.0	112.3	31 23.7	113.4	31 05.8	114.5	30 47.4	115.6	40
30	34 16.8	112.0	33 58.9	113.1	33 40.4	114.3	33 21.3	115.4	33 01.6	116.5	30
20	36 35.0	112.9	36 15.8	114.0	35 56.1	115.2	35 35.7	116.4	35 14.7	117.5	20
10	38 52.3	113.8	38 31.9	115.1	38 10.7	116.3	37 49.0	117.5	37 26.5	118.6	10
3 00	41 08.2	114.9	40 46.5	116.2	40 24.1	117.4	40 00.9	118.6	39 37.1	119.8	3 00
2 50	43 23.1	116.1	43 00.0	117.4	42 36.1	118.6	42 11.4	119.9	41 45.9	121.1	2 50
40	45 36.5	117.4	45 11.8	118.7	44 46.3	120.0	44 20.1	121.3	43 53.0	122.5	40
30	47 48.3	118.9	47 22.0	120.2	46 54.7	121.5	46 26.7	122.8	45 57.7	124.1	30
20	49 58.1	120.5	49 29.9	121.9	49 00.9	123.2	48 31.1	124.6	48 03.7	125.9	20
10	52 05.5	122.4	51 35.5	123.8	51 04.7	125.1	50 32.7	126.5	49 59.9	127.8	10
2 00	54 10.3	124.4	53 38.2	125.8	53 05.2	127.2	52 31.2	128.6	51 56.4	129.9	2 00
1 50	56 12.0	126.7	55 37.6	128.2	55 02.4	129.6	54 26.0	131.0	53 48.8	132.3	1 50
40	58 09.8	129.3	57 32.8	130.8	56 55.2	132.2	56 16.6	133.6	55 37.1	135.0	40
30	60 03.0	132.2	59 23.6	133.8	58 43.4	135.2	58 02.1	136.6	57 20.1	137.9	30
20	61 50.7	135.6	61 08.4	137.1	60 25.6	138.5	59 41.8	139.9	58 57.2	141.2	20
10	63 31.9	139.3	62 46.7	140.8	62 01.0	142.2	61 14.5	143.5	60 27.2	144.8	10
1 00	65 05.0	143.6	64 16.8	145.0	63 28.3	146.4	62 39.0	147.6	61 49.1	148.8	1 00
0 50	66 28.6	148.4	65 37.6	149.7	64 46.1	151.0	63 54.1	152.1	63 01.6	153.2	0 50
40	67 40.8	153.8	66 47.0	155.0	65 52.9	156.0	64 58.4	157.0	64 03.5	158.0	40
30	68 39.7	159.7	67 43.5	160.6	66 47.3	161.5	65 50.4	162.4	64 53.2	163.1	30
20	69 23.8	166.1	68 25.4	166.8	67 27.0	167.5	66 28.5	168.0	65 30.0	168.5	20
10	69 50.8	173.0	68 51.3	173.3	67 51.7	173.7	66 52.1	174.0	65 52.4	174.2	10
0 00	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 37.8	110.1	0 32.1	111.1	0 26.2	112.1	0 20.4	113.1	0 14.6	114.1	5 50
40	2 58.1	110.4	2 51.3	111.4	2 44.6	112.4	2 37.7	113.4	2 30.9	114.4	40
30	5 18.0	110.7	5 10.4	111.7	5 02.5	112.7	4 54.7	113.7	4 46.8	114.7	30
20	7 37.7	111.0	7 29.0	112.0	7 20.3	113.0	7 11.5	114.0	7 02.5	115.0	20
10	9 57.1	111.3	9 47.6	112.3	9 37.7	113.4	9 27.8	114.4	9 17.7	115.4	10
5 00	12 16.1	111.7	12 05.4	112.7	11 54.7	113.8	11 43.8	114.8	11 32.6	115.8	5 00
4 50	14 34.5	112.2	14 23.1	113.2	14 11.2	114.2	13 59.1	115.2	13 46.9	116.2	4 50
40	16 52.8	112.7	16 40.1	113.7	16 27.3	114.7	16 14.2	115.7	16 00.7	116.7	40
30	19 10.3	113.2	18 56.7	114.2	18 42.7	115.3	18 28.4	116.3	18 13.7	117.3	30
20	21 27.4	113.8	21 12.6	114.8	20 57.6	115.9	20 42.1	116.9	20 26.2	117.9	20
10	23 43.8	114.4	23 28.0	115.4	23 11.6	116.5	22 54.8	117.6	22 37.7	118.6	10
4 00	25 59.5	115.1	25 42.5	116.2	25 24.9	117.3	25 07.0	118.3	24 48.5	119.4	4 00
3 50	28 14.3	115.9	27 56.2	117.0	27 37.2	118.1	27 18.0	119.1	26 58.2	120.2	3 50
40	30 28.4	116.7	30 08.7	117.8	29 48.6	118.9	29 28.0	120.0	29 06.8	121.1	40
30	32 41.2	117.7	32 20.4	118.8	31 58.8	119.9	31 36.7	121.0	31 14.2	122.1	30
20	34 53.0	118.7	34 30.6	119.8	34 07.8	120.9	33 44.3	122.0	33 20.1	123.1	20
10	37 03.5	119.8	36 39.7	120.9	36 15.2	122.1	35 50.2	123.2	35 24.5	124.3	10
3 00	39 12.4	121.0	38 47.0	122.1	38 21.0	123.3	37 54.4	124.4	37 27.0	125.5	3 00
2 50	41 19.7	122.3	40 52.7	123.4	40 24.9	124.6	39 56.6	125.7	39 27.5	126.9	2 50
40	43 25.0	123.7	42 56.2	124.9	42 26.8	126.1	41 56.7	127.3	41 25.9	128.5	40
30	45 28.1	125.3	44 57.6	126.6	44 26.2	127.8	43 54.2	129.0	43 21.5	130.1	30
20	47 28.6	127.1	46 56.1	128.4	46 23.0	129.6	45 49.0	130.8	45 14.3	131.9	20
10	49 26.0	129.1	48 51.7	130.3	48 16.5	131.5	47 40.4	132.7	47 03.7	134.0	10
2 00	51 20.5	131.2	50 43.8	132.5	50 06.5	133.7	49 28.4	134.9	48 49.5	136.1	2 00
1 50	53 10.9	133.6	52 32.1	134.9	51 52.4	136.1	51 11.9	137.3	50 30.9	138.5	1 50
40	54 56.7	136.3	54 15.4	137.5	53 33.6	138.7	52 50.9	139.9	52 07.6	141.1	40
30	56 37.2	139.2	55 53.6	140.4	55 09.2	141.6	54 24.2	142.8	53 38.6	143.9	30
20	58 11.8	142.4	57 25.5	143.6	56 38.9	144.8	55 51.5	145.9	55 03.5	147.0	20
10	59 39.0	146.0	58 50.6	147.2	58 01.4	148.3	57 11.7	149.3	56 21.4	150.3	10
1 00	60 58.5	150.0	60 07.3	151.0	59 15.9	152.0	58 23.9	153.0	57 31.5	154.0	1 00
0 50	62 08.6	154.2	61 15.2	155.2	60 21.2	156.1	59 27.1	156.9	58 32.6	157.8	0 50
40	63 08.2	158.9	62 12.5	159.7	61 16.8	160.4	60 20.7	161.1	59 24.4	161.8	40
30	63 56.0	163.8	62 58.7	164.5	62 01.1	165.1	61 03.4	165.6	60 05.5	166.2	30
20	64 31.2	169.0	63 32.4	169.5	62 33.6	169.9	61 34.7	170.3	60 35.7	170.7	20
10	64 52.8	174.5	63 52.9	174.7	62 53.4	174.9	61 53.6	175.1	60 53.9	175.3	10
0 00	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 06.3	89.0	0 12.6	88.0	0 18.8	87.0	0 25.1	86.0	6 00
5 50	2 29.2	90.2	2 35.5	89.3	2 41.6	88.3	2 47.8	87.3	2 54.0	86.3	5 50
40	4 58.4	90.5	5 04.6	89.5	5 10.8	88.5	5 16.8	87.5	5 22.8	86.5	40
30	7 27.6	90.8	7 33.8	89.8	7 39.8	88.8	7 45.9	87.8	7 51.8	86.8	30
20	9 56.7	91.1	10 02.9	90.1	10 09.0	89.0	10 15.0	88.0	10 20.7	87.0	20
10	12 25.8	91.3	12 32.2	90.3	12 38.2	89.3	12 44.1	88.3	12 49.8	87.2	10
5 00	14 54.9	91.6	15 01.3	90.6	15 07.3	89.6	15 13.1	88.6	15 18.6	87.5	5 00
4 50	17 24.0	91.9	17 30.6	90.8	17 36.6	89.8	17 42.3	88.8	17 47.8	87.7	4 50
40	19 53.1	92.2	19 59.6	91.1	20 05.7	90.1	20 11.4	89.0	20 16.8	87.9	40
30	22 22.2	92.5	22 28.9	91.4	22 34.9	90.3	22 40.6	89.2	22 45.9	88.1	30
20	24 51.2	92.8	24 57.8	91.7	25 04.0	90.6	25 09.8	89.5	25 15.0	88.4	20
10	27 20.2	93.1	27 27.0	92.0	27 33.2	90.9	27 39.0	89.8	27 44.2	88.6	10
4 00	29 49.1	93.5	29 56.0	92.3	30 02.4	91.2	30 08.1	90.0	30 13.3	88.9	4 00
3 50	32 18.0	93.8	32 25.2	92.6	32 31.6	91.5	32 37.3	90.3	32 42.6	89.1	3 50
40	34 46.9	94.2	34 54.1	93.0	35 00.6	91.8	35 11.6	90.6	35 16.0	89.3	40
30	37 15.6	94.6	37 23.2	93.3	37 29.8	92.1	37 35.6	90.8	37 40.8	89.6	30
20	39 44.2	95.0	39 51.9	93.7	39 58.8	92.4	40 04.8	91.1	40 09.9	89.8	20
10	42 12.8	95.5	42 20.9	94.1	42 27.9	92.8	42 34.0	91.4	42 39.2	90.1	10
3 00	44 41.2	96.0	44 49.5	94.6	44 56.7	93.2	45 03.1	91.8	45 08.3	90.4	3 00
2 50	47 09.6	96.5	47 18.2	95.0	47 25.8	93.6	47 32.2	92.1	47 37.6	90.6	2 50
40	49 37.6	97.1	49 46.7	95.6	49 54.5	94.0	50 01.2	92.5	50 06.6	90.9	40
30	52 05.6	97.8	52 15.2	96.2	52 23.4	94.5	52 30.1	92.9	52 35.8	91.2	30
20	54 33.2	98.5	54 43.3	96.8	54 52.0	95.1	54 59.2	93.4	55 05.0	91.6	20
10	57 00.6	99.3	57 11.4	97.5	57 20.5	95.7	57 28.0	93.8	57 34.0	92.0	10
2 00	59 27.6	100.3	59 39.1	98.3	59 48.8	96.4	59 56.9	94.4	60 03.1	92.4	2 00
1 50	61 54.2	101.4	62 06.5	99.3	62 17.0	97.2	62 25.5	95.0	62 32.1	92.9	1 50
40	64 20.1	102.6	64 33.4	100.4	64 44.8	98.1	64 54.2	95.8	65 01.1	93.4	40
30	66 45.2	104.2	67 00.1	101.7	67 12.2	99.2	67 22.2	96.6	67 30.2	94.0	30
20	69 09.3	106.0	69 25.5	103.3	69 39.4	100.5	69 50.5	97.7	69 58.7	94.8	20
10	71 31.8	108.3	71 50.2	105.3	72 05.6	102.2	72 18.0	99.0	72 27.2	95.7	10
1 00	73 52.2	111.3	74 13.2	107.9	74 30.9	104.4	74 45.0	100.7	74 55.5	96.9	1 00
0 50	76 09.3	115.2	76 33.8	111.4	76 54.5	107.3	77 11.0	103.0	77 23.5	98.5	0 50
40	78 21.2	120.7	78 50.2	116.2	79 15.2	111.5	79 35.4	106.3	79 50.4	100.9	40
30	80 24.4	128.5	81 00.2	123.4	81 31.0	117.8	81 56.5	111.5	82 16.5	104.6	30
20	82 11.6	140.1	82 56.1	134.9	83 36.4	128.5	84 10.9	120.8	84 37.9	111.6	20
10	83 30.1	157.3	84 24.7	153.4	85 17.2	184.0	86 06.0	140.2	86 48.4	128.6	10
0 00	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 31.3	85.0	0 37.5	84.0	0 43.8	83.0	0 50.0	82.1	0 56.2	81.1	6 00
5 50	3 00.0	85.3	3 06.1	84.3	3 11.9	83.3	3 17.8	82.3	3 23.7	81.3	5 50
40	5 28.7	85.5	5 34.4	84.5	5 40.1	83.5	5 45.7	82.5	5 51.1	81.5	40
30	7 57.4	85.8	8 03.0	84.8	8 08.4	83.8	8 13.6	82.8	8 18.7	81.8	30
20	10 26.2	86.0	10 31.5	85.0	10 36.7	84.0	10 41.6	83.0	10 46.4	82.0	20
10	12 55.1	86.2	13 00.2	85.2	13 05.2	84.2	13 09.9	83.2	13 14.3	82.1	10
5 00	15 23.9	86.4	15 28.8	85.4	15 33.6	84.4	15 37.9	83.4	15 41.9	82.3	5 00
4 50	17 52.8	86.7	17 57.6	85.6	18 01.9	84.6	18 06.2	83.5	18 09.8	82.5	4 50
40	20 21.7	86.9	20 26.3	85.8	20 30.6	84.8	20 34.3	83.7	20 37.7	82.6	40
30	22 50.8	87.1	22 55.2	86.0	22 59.1	84.9	23 02.7	83.8	23 05.6	82.8	30
20	25 19.7	87.3	25 23.9	86.2	25 27.8	85.1	25 30.9	84.0	25 33.7	82.9	20
10	27 48.8	87.5	27 52.8	86.4	27 56.4	85.2	27 59.4	84.1	28 01.7	83.0	10
4 00	30 17.8	87.7	30 21.7	86.6	30 25.1	85.4	30 27.7	84.2	30 29.8	83.1	4 00
3 50	32 46.9	87.9	32 50.7	86.7	32 53.7	85.5	32 56.2	84.3	32 57.8	83.2	3 50
40	35 16.0	88.1	35 19.5	86.9	35 22.6	85.7	35 24.6	84.4	35 26.1	83.2	40
30	37 45.0	88.3	37 48.6	87.0	37 51.3	85.8	37 53.1	84.5	37 54.2	83.3	30
20	40 14.2	88.5	40 17.5	87.2	40 20.1	85.9	40 21.6	84.6	40 22.3	83.3	20
10	42 43.3	88.7	42 46.6	87.4	42 48.8	86.0	42 50.2	84.6	42 50.5	83.3	10
3 00	45 12.5	89.0	45 15.6	87.5	45 17.7	86.1	45 18.7	84.7	45 18.7	83.3	3 00
2 50	47 41.6	89.2	47 44.7	87.7	47 46.4	86.6	47 47.3	84.7	47 46.7	83.2	2 50
40	50 10.8	89.4	50 13.7	87.8	50 15.4	86.3	50 15.8	84.7	50 14.9	83.1	40
30	52 40.0	89.6	52 42.8	88.0	52 44.2	86.3	52 44.3	84.7	52 43.0	83.0	30
20	55 09.1	89.9	55 11.9	88.1	55 13.2	86.4	55 12.8	84.6	55 11.0	82.9	20
10	57 38.4	90.1	57 41.0	88.2	57 42.0	86.4	57 41.4	84.5	57 39.0	82.7	10
2 00	60 07.5	90.4	60 10.1	88.4	60 10.9	86.4	60 09.9	84.4	60 06.9	82.4	2 00
1 50	62 36.6	90.7	62 39.2	88.5	62 39.7	86.4	62 38.3	84.2	62 34.7	82.0	1 50
40	65 05.8	91.0	65 08.3	88.7	65 08.7	86.3	65 06.7	83.9	65 02.4	81.6	40
30	67 34.9	91.4	67 37.5	88.8	67 37.6	86.2	67 35.0	83.6	67 29.7	81.0	30
20	70 04.1	91.9	70 06.5	89.0	70 06.4	86.0	70 03.1	83.1	69 57.0	80.2	20
10	72 33.2	92.5	72 35.8	89.1	72 35.0	85.7	72 31.2	82.4	72 23.8	79.2	10
1 00	75 02.2	93.1	75 04.9	89.2	75 04.0	85.3	74 58.7	81.5	74 49.9	77.7	1 00
0 50	77 31.0	94.0	77 34.1	89.4	77 32.4	84.7	77 26.4	80.1	77 15.0	75.7	0 50
40	79 59.8	95.2	80 03.3	89.5	80 00.8	83.7	79 52.5	78.0	79 38.6	72.6	40
30	82 28.0	97.3	82 32.5	89.6	83 29.0	82.0	82 18.0	74.5	81 58.5	67.6	30
20	84 55.4	101.1	85 01.7	89.7	84 55.9	78.3	84 38.9	67.7	84 12.3	58.5	20
10	87 19.0	111.8	87 30.8	89.9	87 19.3	68.0	86 48.8	51.0	86 06.5	39.4	10
0 00	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 02.4	80.1	1 08.5	79.1	1 14.7	78.1	1 20.8	77.1	1 27.0	76.1	6 00
5 50	3 29.4	80.3	3 35.1	79.3	3 40.8	78.3	3 46.4	77.3	3 51.9	76.3	5 50
40	5 56.4	80.5	6 01.7	79.5	6 06.9	78.5	6 11.9	77.5	6 16.8	76.5	40
30	8 23.7	80.7	8 28.4	79.7	8 33.1	78.7	8 37.6	77.7	8 41.9	76.7	30
20	10 50.9	80.9	10 55.2	79.9	10 59.5	78.9	11 03.4	77.9	11 07.1	76.9	20
10	13 18.3	81.1	13 22.3	80.1	13 25.9	79.1	13 29.3	78.0	13 32.5	77.0	10
5 00	15 45.7	81.3	15 49.2	80.3	15 52.4	79.2	15 55.3	78.2	15 57.9	77.1	5 00
4 50	18 13.2	81.4	18 16.2	80.4	18 19.0	79.3	18 21.4	78.3	18 23.3	77.2	4 50
40	20 40.7	81.6	20 43.2	80.5	20 45.6	79.4	20 47.4	78.4	20 48.9	77.3	40
30	23 08.3	81.7	23 10.5	80.6	23 12.2	79.5	23 13.6	78.4	23 14.4	77.3	30
20	25 35.9	81.8	25 37.6	80.7	25 39.0	79.6	25 39.6	78.4	25 39.9	77.3	20
10	28 03.6	81.9	28 04.9	80.7	28 05.6	79.6	28 05.8	78.5	28 05.4	77.3	10
4 00	30 31.2	81.9	30 32.0	80.8	30 32.4	79.6	30 31.9	78.4	30 31.0	77.3	4 00
3 50	32 59.0	82.0	32 59.4	80.8	32 59.1	79.6	32 58.1	78.4	32 56.5	77.2	3 50
40	35 26.7	82.0	35 26.5	80.8	35 25.8	79.5	35 24.2	78.3	35 21.9	77.1	40
30	37 54.3	82.0	37 53.9	80.7	37 52.5	79.4	37 50.3	78.2	37 47.3	76.9	30
20	40 22.1	82.0	40 21.0	80.6	40 19.1	79.3	40 16.2	78.0	40 12.6	76.7	20
10	42 49.9	81.9	42 48.3	80.5	42 45.6	79.2	42 42.1	77.8	42 37.6	76.5	10
3 00	45 17.4	81.8	45 15.3	80.4	45 12.2	79.0	45 07.9	77.6	45 02.6	76.2	3 00
2 50	47 45.1	81.7	47 42.4	80.2	47 38.5	78.8	47 33.4	77.3	47 27.3	75.8	2 50
40	50 12.7	81.6	50 09.4	80.0	50 04.8	78.5	49 58.9	76.9	49 51.8	75.4	40
30	52 40.2	81.4	52 36.2	79.7	52 30.8	78.1	52 24.1	76.5	52 16.0	74.8	30
20	55 07.7	81.1	55 02.9	79.4	54 56.7	77.7	54 49.0	75.9	54 39.8	74.2	20
10	57 35.0	80.8	57 29.5	78.9	57 22.3	77.1	57 13.4	75.2	57 03.0	73.4	10
2 00	60 02.1	80.4	59 55.6	78.4	59 47.5	76.4	59 37.4	74.5	59 25.7	72.5	2 00
1 50	62 29.2	79.9	62 21.7	77.7	62 12.3	75.6	62 00.7	73.5	61 47.5	71.4	1 50
40	64 55.8	79.2	64 47.1	76.9	64 36.4	74.6	64 23.3	72.3	64 08.5	70.1	40
30	67 22.4	78.4	67 12.2	75.8	66 59.9	73.4	66 44.9	70.8	66 27.7	68.4	30
20	69 48.0	77.3	69 36.3	74.5	69 22.1	71.7	69 05.0	69.0	68 45.6	66.4	20
10	72 13.3	75.9	71 59.6	72.7	71 42.8	69.6	71 23.2	66.6	71 00.9	63.7	10
1 00	74 37.1	74.0	74 20.8	70.4	74 01.6	66.9	73 38.6	63.6	73 13.0	60.4	1 00
0 50	76 59.5	71.3	76 40.4	67.1	76 16.7	63.2	75 50.0	59.5	75 19.5	56.0	0 50
40	79 19.3	67.4	78 55.3	62.6	78 26.9	58.0	77 54.6	53.9	77 19.2	50.1	40
30	81 33.5	61.2	81 04.0	55.7	80 27.2	50.5	79 49.0	46.0	79 06.7	42.1	30
20	83 38.0	50.7	82 58.1	44.4	82 13.8	39.1	81 26.2	34.8	80 36.3	31.2	20
10	85 17.8	31.6	84 25.4	26.1	83 30.7	22.2	82 34.7	19.2	81 37.8	16.9	10
0 00	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 33.0	75.1	1 39.1	74.1	1 45.0	73.1	1 51.0	72.1	1 57.0	71.1	6 00
5 50	3 57.3	75.3	4 02.6	74.3	4 07.9	73.3	4 13.1	72.3	4 18.2	71.3	5 50
40	6 21.6	75.5	6 26.3	74.5	6 30.9	73.5	6 35.2	72.5	6 39.6	71.5	40
30	8 46.1	75.7	8 50.1	74.7	8 53.9	73.7	8 57.6	72.7	9 01.2	71.7	30
20	11 10.6	75.9	11 14.1	74.8	11 17.1	73.8	11 20.1	72.8	11 22.8	71.8	20
10	13 35.4	76.0	13 38.1	74.9	13 40.5	73.9	13 42.7	72.9	13 44.5	71.9	10
5 00	16 00.2	76.1	16 02.1	75.0	16 03.8	74.0	16 05.2	73.0	16 06.4	71.9	5 00
4 50	18 25.0	76.2	18 26.3	75.1	18 27.3	74.0	18 27.9	73.0	18 28.2	71.9	4 50
40	20 49.8	76.2	20 50.5	75.1	20 50.7	74.1	20 50.5	73.0	20 50.0	71.9	40
30	23 14.7	76.2	23 14.7	75.1	23 14.1	74.0	23 13.1	73.0	23 11.7	71.9	30
20	25 39.6	76.2	25 38.8	75.1	25 37.5	74.0	25 35.7	72.9	25 33.5	71.8	20
10	28 04.5	76.2	28 03.0	75.1	28 01.0	73.9	27 58.3	72.8	27 55.1	71.7	10
4 00	30 29.3	76.1	30 27.1	75.0	30 24.2	73.8	30 20.7	72.6	30 16.7	71.5	4 00
3 50	32 54.1	76.0	32 51.1	74.8	32 47.5	73.6	32 43.1	72.4	32 38.0	71.3	3 50
40	35 18.7	75.9	35 15.0	74.6	35 10.4	73.4	35 05.2	72.2	34 59.2	71.0	40
30	37 43.3	75.7	37 38.7	74.4	37 33.3	73.1	37 27.1	71.9	37 20.0	70.6	30
20	40 07.8	75.4	40 02.3	74.1	39 55.9	72.8	39 48.7	71.5	39 40.6	70.2	20
10	42 32.2	75.1	42 25.7	73.8	42 18.3	72.4	42 10.1	71.1	42 00.9	69.8	10
3 00	44 56.2	74.8	44 48.8	73.4	44 40.4	72.0	44 31.0	70.6	44 20.6	69.2	3 00
2 50	47 20.0	74.3	47 11.5	72.9	47 02.0	71.4	46 51.4	70.0	46 40.7	68.6	2 50
40	49 43.4	73.8	49 33.9	72.3	49 23.1	70.8	49 11.2	69.3	48 58.2	67.8	40
30	52 06.5	73.2	51 55.7	71.6	51 43.7	70.1	51 30.4	68.5	51 15.9	66.9	30
20	54 29.1	72.5	54 17.0	70.8	54 03.5	69.2	53 48.7	67.5	53 32.6	65.9	20
10	56 50.9	71.7	56 37.5	69.8	56 22.5	68.1	56 06.3	66.3	55 48.1	64.7	10
2 00	59 12.2	70.6	58 57.1	68.7	58 40.3	66.9	58 22.0	65.1	58 02.2	63.3	2 00
1 50	61 32.4	69.4	61 15.4	67.4	60 56.7	65.6	60 36.3	63.5	60 14.2	61.6	1 50
40	63 51.3	67.9	63 32.4	65.8	63 11.3	63.7	62 48.7	61.6	62 24.5	59.6	40
30	66 08.6	66.1	65 47.3	63.8	65 23.9	61.5	64 58.6	59.4	64 31.5	57.3	30
20	68 23.7	63.8	67 59.8	61.3	67 33.4	59.0	67 05.3	56.7	66 35.3	54.5	20
10	70 36.0	61.0	70 08.7	58.3	69 39.1	55.8	69 07.5	53.4	68 34.2	51.1	10
1 00	72 44.2	57.4	72 13.2	54.6	71 39.6	51.9	71 04.1	49.4	70 26.8	47.0	1 00
0 50	74 46.7	52.8	74 11.0	49.8	73 33.3	47.0	72 53.0	44.4	72 11.2	42.0	0 50
40	76 40.7	46.7	75 59.8	43.6	75 16.7	40.8	74 31.8	38.3	73 45.5	36.0	40
30	78 22.0	38.7	77 35.3	35.8	76 46.5	33.1	75 56.5	30.8	75 05.0	28.7	30
20	79 44.8	28.2	78 51.8	25.7	77 57.6	23.6	77 02.6	21.7	76 07.1	20.1	20
10	80 40.3	15.1	79 42.2	13.6	78 43.9	12.3	77 45.3	11.3	76 46.4	10.4	10
0 00	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 03.2	66.9	0 10.0	65.9	6 10
6 00	2 03.0	70.1	2 08.8	69.1	2 14.6	68.1	2 20.4	67.1	2 26.2	66.1	6 00
5 50	4 23.3	70.3	4 28.2	69.3	4 33.2	68.3	4 38.0	67.3	4 42.7	66.3	5 50
40	6 43.9	70.5	6 48.0	69.5	6 51.8	68.5	6 55.7	67.5	6 59.4	66.5	40
30	9 04.5	70.7	9 07.7	69.6	9 10.7	68.6	9 13.5	67.6	9 16.2	66.6	30
20	11 25.3	70.8	11 27.6	69.7	11 29.7	68.7	11 31.6	67.7	11 33.2	66.7	20
10	13 46.2	70.8	13 47.5	69.8	13 48.7	68.8	13 49.7	67.7	13 50.2	66.7	10
5 00	16 07.1	70.9	16 07.6	69.8	16 07.7	68.8	16 07.7	67.8	16 07.3	66.7	5 00
4 50	18 28.1	70.9	18 27.7	69.8	18 26.8	68.8	18 25.7	67.7	18 24.3	66.7	4 50
40	20 49.1	70.9	20 47.7	69.8	20 45.9	68.7	20 43.7	67.7	20 41.2	66.6	40
30	23 10.0	70.8	23 07.7	69.7	23 04.9	68.6	23 01.7	67.5	22 58.0	66.5	30
20	25 30.8	70.7	25 27.5	69.6	25 23.6	68.5	25 19.4	67.4	25 14.7	66.3	20
10	27 51.2	70.5	27 47.2	69.4	27 42.3	68.3	27 36.9	67.2	27 31.1	66.0	10
4 00	30 12.0	70.3	30 06.8	69.2	30 00.8	68.0	29 54.4	66.9	29 47.3	65.7	4 00
3 50	32 32.3	70.1	32 26.1	68.9	32 19.0	67.7	32 11.4	66.5	32 03.1	65.4	3 50
40	34 52.5	69.8	34 45.1	68.6	34 36.8	67.4	34 28.0	66.1	34 18.5	65.0	40
30	37 12.3	69.4	37 03.7	68.2	36 54.3	66.9	36 44.2	65.7	36 33.3	64.5	30
20	39 31.7	69.0	39 22.0	67.7	39 11.2	66.4	38 59.9	65.1	38 47.6	63.9	20
10	41 50.7	68.4	41 39.7	67.1	41 27.7	65.8	41 14.9	64.5	41 01.2	63.2	10
3 00	44 09.2	67.8	43 56.8	66.5	43 43.3	65.1	43 29.1	63.8	43 13.9	62.4	3 00
2 50	46 27.0	67.1	46 13.1	65.7	45 58.4	64.3	45 42.4	63.0	45 25.6	61.5	2 50
40	48 44.1	66.3	48 28.7	64.9	48 12.2	63.4	47 54.8	62.0	47 36.3	60.5	40
30	51 00.2	65.4	50 43.2	63.9	50 25.0	62.4	50 05.9	60.9	49 45.5	59.4	30
20	53 15.2	64.3	52 56.6	62.7	52 36.4	61.1	52 15.3	59.6	51 53.0	58.0	20
10	55 30.2	62.9	55 08.2	61.3	54 46.2	59.7	54 22.9	58.1	53 58.6	56.5	10
2 00	57 41.0	61.5	57 18.3	59.8	56 53.9	58.1	56 28.5	56.5	56 01.9	54.8	2 00
1 50	59 50.9	59.8	59 25.9	58.8	58 59.2	56.2	58 31.5	54.5	58 02.2	52.8	1 50
40	61 58.6	57.7	61 31.0	55.8	61 01.7	54.0	60 31.3	52.2	59 59.4	50.5	40
30	64 02.9	55.3	63 32.4	53.3	63 00.4	51.4	62 27.1	49.6	61 52.4	47.9	30
20	66 03.3	52.4	65 29.9	50.3	64 54.5	48.4	64 18.1	46.6	63 40.3	44.8	20
10	67 58.9	48.9	67 21.5	46.8	66 43.1	44.9	66 03.4	43.0	65 22.0	41.2	10
1 00	69 47.7	44.8	69 07.0	42.7	68 24.4	40.7	67 41.1	38.9	66 56.5	37.1	1 00
0 50	71 28.0	39.8	70 43.2	37.7	69 57.0	35.8	69 09.7	34.1	68 21.6	32.4	0 50
40	72 57.7	33.9	72 08.7	31.9	71 18.2	30.2	70 27.5	28.6	69 35.8	27.1	40
30	74 13.0	26.8	73 20.0	25.1	72 26.2	23.7	71 31.5	22.3	70 36.5	21.1	30
20	75 11.0	18.7	74 14.3	17.4	73 17.1	16.3	72 19.9	15.3	71 22.3	14.4	20
10	75 47.4	9.6	74 48.3	8.9	73 49.1	8.3	72 49.8	7.8	71 50.4	7.3	10
0 00	76 0.0	0.0	75 0.0	0.0	74 0.0	0.0	73 0.0	0.0	72 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 29.2	90.2	2 22.9	91.3	2 16.5	92.3	2 10.2	93.3	2 03.8	94.2	5 50
40	4 58.4	90.5	4 52.0	91.5	4 45.6	92.5	4 39.0	93.5	4 32.5	94.5	40
30	7 27.6	90.8	7 21.1	91.8	7 14.5	92.8	7 07.9	93.8	7 01.1	94.8	30
20	9 56.7	91.1	9 50.1	92.1	9 43.5	93.1	9 36.8	94.1	9 29.8	95.1	20
10	12 25.8	91.3	12 19.4	92.3	12 12.6	93.4	12 05.6	94.4	11 58.3	95.4	10
5 00	14 54.9	91.6	14 48.3	92.6	14 41.4	93.7	14 34.2	94.7	14 26.8	95.7	5 00
4 50	17 24.0	91.6	17 17.4	92.9	17 10.2	94.0	17 02.9	95.0	16 55.2	96.1	4 50
40	19 53.1	92.2	19 46.3	93.2	19 39.1	94.3	19 31.5	95.3	19 23.5	96.4	40
30	22 22.2	92.5	22 15.2	93.5	22 07.8	94.6	21 59.9	95.7	21 51.7	96.8	30
20	24 51.2	92.8	24 44.0	93.9	24 36.4	95.0	24 28.4	96.1	24 19.7	97.2	20
10	27 20.2	93.1	27 12.8	94.2	27 05.0	95.3	26 56.7	96.5	26 47.7	97.6	10
4 00	29 49.1	93.5	29 41.5	94.6	29 33.5	95.7	29 24.8	96.9	29 15.5	98.0	4 00
3 50	32 18.0	93.8	32 10.3	95.0	32 01.9	96.1	31 52.9	97.3	31 43.2	98.5	3 50
40	34 46.9	94.2	34 38.8	95.4	34 30.1	96.6	34 20.7	97.8	34 10.6	99.0	40
30	37 15.6	94.6	37 07.3	95.8	36 58.2	97.1	36 48.4	98.3	36 37.8	99.5	30
20	39 44.2	95.0	39 35.7	96.3	39 26.2	97.6	39 15.9	98.9	39 04.8	100.1	20
10	42 12.8	95.5	42 03.9	96.8	41 54.0	98.1	41 43.2	99.5	41 31.6	100.8	10
3 00	44 41.2	96.0	44 31.9	97.3	44 21.5	98.7	44 10.3	100.1	43 58.0	101.5	3 00
2 50	47 09.6	96.5	46 59.8	97.9	46 48.9	99.4	46 36.9	100.8	46 23.9	102.3	2 50
40	49 37.6	97.1	49 27.4	98.6	49 15.9	100.1	49 03.3	101.6	48 49.5	103.1	40
30	52 05.6	97.8	51 54.8	99.4	51 42.6	101.0	51 29.1	102.5	51 14.4	104.1	30
20	54 33.2	98.5	54 21.7	100.2	54 08.8	101.9	53 54.6	103.5	53 38.9	105.1	20
10	57 00.6	99.3	56 48.2	101.1	56 34.5	102.9	56 19.1	104.6	56 02.4	106.4	10
2 00	59 27.6	100.3	59 14.5	102.2	58 59.6	104.1	58 43.2	105.9	58 25.1	107.8	2 00
1 50	61 54.2	101.4	61 39.9	103.4	61 23.9	105.4	61 06.0	107.4	60 46.5	109.4	1 50
40	64 20.1	102.6	64 04.5	104.9	63 47.2	107.0	63 27.8	109.2	63 06.5	111.3	40
30	66 45.2	104.2	66 28.2	106.6	66 09.0	108.9	65 47.6	111.2	65 24.5	112.5	30
20	69 09.3	106.0	68 50.4	108.7	68 29.3	111.3	68 05.6	113.7	67 39.9	116.1	20
10	71 31.8	108.3	71 10.6	111.3	70 46.8	114.1	70 20.5	116.8	69 51.9	119.4	10
1 00	73 52.2	111.3	73 28.1	114.6	73 01.2	117.7	72 31.7	120.6	71 59.5	123.4	1 00
0 50	76 09.3	115.2	75 41.2	118.9	75 10.2	122.3	74 36.5	125.5	74 00.2	128.4	0 50
40	78 21.2	120.7	77 48.4	124.7	77 12.2	128.4	76 33.4	131.8	75 52.1	134.9	40
30	80 24.4	128.5	79 45.0	132.8	79 02.5	136.7	78 17.2	140.0	77 30.5	143.0	30
20	82 11.6	140.1	81 24.1	144.4	80 34.3	147.9	79 42.5	150.9	78 49.5	153.4	20
10	63 30.1	157.3	82 34.1	160.3	81 37.2	162.6	80 39.6	164.4	79 41.6	165.9	10
0 00	84 0.0	180.0	83 0.0	180.0	82 0.0	180.0	81 0.0	180.0	80 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 57.3	95.2	1 50.8	96.2	1 44.2	97.2	1 37.8	98.2	1 31.2	99.2	5 50
40	4 25.8	95.5	4 19.0	96.5	4 12.2	97.5	4 05.3	98.5	3 58.3	99.5	40
30	6 54.3	95.8	6 47.2	96.8	6 40.0	97.8	6 32.6	98.8	6 25.4	99.8	30
20	9 22.6	96.1	9 15.3	97.1	9 07.8	98.1	9 00.1	99.1	8 52.3	100.1	20
10	11 50.9	96.4	11 43.3	97.4	11 35.5	98.4	11 27.4	99.4	11 18.1	100.4	10
5 00	14 19.1	96.7	14 11.1	97.8	14 02.9	98.8	13 54.4	99.8	13 45.7	100.8	5 00
4 50	16 47.2	97.1	16 38.9	98.1	16 30.2	99.1	16 21.4	100.2	16 12.2	101.2	4 50
40	19 15.2	97.4	19 06.5	98.5	18 57.5	99.5	18 48.1	100.6	18 38.3	101.6	40
30	21 43.1	97.8	21 34.0	98.9	21 24.6	99.9	21 14.7	101.0	21 04.3	102.0	30
20	24 10.7	98.2	24 01.2	99.3	23 51.4	100.4	23 41.0	101.5	23 30.1	102.5	20
10	26 38.3	98.7	26 28.4	99.8	26 17.9	100.9	26 07.1	102.0	25 55.5	103.0	10
4 00	29 05.7	99.1	28 55.2	100.3	28 44.3	101.4	28 32.8	102.5	28 20.7	103.6	4 00
3 50	31 32.9	99.6	31 21.9	100.8	31 10.5	101.9	30 58.4	103.1	30 45.5	104.2	3 50
40	33 59.9	100.2	33 48.3	101.4	33 36.2	102.5	33 23.4	103.7	33 10.0	104.9	40
30	36 26.5	100.8	36 14.4	102.0	36 01.7	103.2	35 48.1	104.4	35 33.9	105.6	30
20	38 52.9	101.4	38 40.2	102.6	38 26.7	103.9	38 12.4	105.1	37 57.3	106.4	20
10	41 19.0	102.1	41 05.6	103.4	40 51.3	104.7	40 36.1	105.9	40 20.2	107.2	10
3 00	43 44.7	102.8	43 30.5	104.2	43 15.4	105.5	42 59.3	106.8	42 42.4	108.1	3 00
2 50	46 09.9	103.7	45 54.8	105.1	45 38.7	106.4	45 21.7	107.8	45 03.6	109.2	2 50
40	48 34.6	104.6	48 18.6	106.0	48 01.5	107.4	47 43.4	108.9	47 24.1	110.3	40
30	50 58.9	105.6	50 41.5	107.1	50 23.3	108.6	50 03.9	110.1	49 43.4	111.6	30
20	53 21.9	106.7	53 03.7	108.3	52 44.2	109.9	52 23.5	111.5	52 01.5	113.0	20
10	55 44.4	108.1	55 24.6	109.7	55 03.9	111.4	54 41.6	113.0	54 18.1	114.6	10
2 00	58 05.5	109.5	57 44.4	111.3	57 21.9	113.1	56 58.1	114.7	56 32.8	116.4	2 00
1 50	60 25.2	111.3	60 02.6	113.1	59 38.3	115.0	59 12.4	116.7	58 45.2	118.5	1 50
40	62 43.4	113.3	62 18.6	115.2	61 52.4	117.2	61 24.4	119.0	60 54.9	120.8	40
30	64 59.1	115.6	64 32.2	117.7	64 03.5	119.8	63 33.1	121.7	63 01.0	123.6	30
20	67 12.2	118.4	66 42.3	120.7	66 11.1	122.8	65 37.9	124.8	65 03.1	126.8	20
10	69 21.2	121.8	68 48.2	124.2	68 13.8	126.4	67 37.6	128.5	66 59.6	130.6	10
1 00	71 25.1	126.0	70 48.7	128.4	70 10.7	130.8	69 30.7	132.9	68 49.3	135.0	1 00
0 50	73 21.8	131.2	72 40.8	133.7	71 59.0	136.0	71 15.3	138.2	70 30.0	140.2	0 50
40	75 08.7	137.6	74 23.4	140.1	73 36.9	142.4	72 48.8	144.4	71 59.4	146.3	40
30	76 41.5	145.6	75 51.2	147.9	75 00.0	150.0	74 07.7	151.8	73 14.4	153.4	30
20	77 55.2	155.5	77 00.2	157.3	76 04.6	158.9	75 08.3	160.4	74 11.6	161.6	20
10	78 43.2	167.2	77 44.6	168.2	76 45.6	169.1	75 46.8	169.9	74 47.7	170.6	10
0 00	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 24.5	100.2	1 17.9	101.2	1 11.2	102.2	1 04.6	103.2	0 57.9	104.2	5 50
40	3 51.2	100.5	3 44.0	101.5	3 36.9	102.5	3 29.6	103.5	3 22.3	104.5	40
30	6 17.8	100.8	6 10.2	101.8	6 02.4	102.8	5 54.7	103.8	5 46.7	104.8	30
20	8 44.3	101.1	8 36.1	102.1	8 27.9	103.1	8 19.3	104.1	8 10.8	105.1	20
10	11 10.6	101.4	11 01.9	102.5	10 53.1	103.5	10 44.0	104.5	10 34.7	105.5	10
5 00	13 36.7	101.8	13 27.4	102.9	13 18.0	103.9	13 08.2	104.9	12 58.3	105.9	5 00
4 50	16 02.6	102.2	15 52.7	103.3	15 42.7	104.3	15 32.4	105.3	15 21.7	106.3	4 50
40	18 28.2	102.7	18 17.8	103.7	18 07.1	104.7	17 56.0	105.8	17 44.6	106.8	40
30	20 53.7	103.1	20 42.6	104.2	20 31.2	105.2	20 19.5	106.3	20 07.3	107.3	30
20	23 18.8	103.6	23 07.1	104.7	22 55.0	105.7	22 42.4	106.8	22 29.4	107.9	20
10	25 43.7	104.1	25 31.2	105.2	25 18.4	106.3	25 05.0	107.4	24 51.3	108.5	10
4 00	28 08.1	104.7	27 54.9	105.8	27 41.4	106.9	27 27.1	108.0	27 12.4	109.1	4 00
3 50	30 32.3	105.3	30 18.3	106.5	30 03.8	107.6	29 48.7	108.7	29 33.2	109.8	3 50
40	32 55.8	106.0	32 41.0	107.2	32 25.7	108.3	32 09.6	109.5	31 53.0	110.6	40
30	35 18.8	106.8	35 03.3	108.0	34 47.0	109.1	34 30.1	110.3	34 12.4	111.5	30
20	37 41.4	107.6	37 24.8	108.8	37 07.6	110.0	36 49.4	111.2	36 30.8	112.4	20
10	40 03.4	108.5	39 45.7	109.7	39 27.4	110.9	39 08.2	112.2	38 48.3	113.4	10
3 00	42 24.4	109.4	42 05.7	110.7	41 46.2	112.0	41 25.7	113.3	41 04.5	114.5	3 00
2 50	44 44.6	110.5	44 24.7	111.8	44 03.9	113.1	43 42.2	114.4	43 19.7	115.7	2 50
40	47 03.9	111.7	46 42.6	113.0	46 20.6	114.4	45 57.4	115.7	45 33.3	117.0	40
30	49 21.8	113.0	48 59.3	114.4	48 35.6	115.8	48 11.0	117.2	47 45.4	118.5	30
20	51 38.4	114.5	51 14.2	115.9	50 49.1	117.4	50 22.7	118.8	49 55.4	120.2	20
10	53 53.4	116.1	53 27.4	117.7	53 00.4	119.2	52 32.3	120.6	52 03.2	122.1	10
2 00	56 06.1	118.0	55 38.4	119.6	55 09.5	121.1	54 39.3	122.6	54 08.2	124.1	2 00
1 50	58 16.6	120.1	57 46.8	121.8	57 15.7	123.4	56 43.5	124.9	56 10.1	126.4	1 50
40	60 24.0	122.6	59 51.8	124.3	59 18.5	125.9	58 43.7	127.5	58 08.1	129.0	40
30	62 27.9	125.4	61 53.0	127.2	61 17.2	128.8	60 39.9	130.4	60 01.5	132.0	30
20	64 26.8	128.7	63 49.3	130.5	63 10.6	132.2	62 30.4	133.8	61 49.4	135.4	20
10	66 20.4	132.5	65 39.7	134.3	64 57.8	136.0	64 14.9	137.6	63 30.7	139.1	10
1 00	68 06.4	136.9	67 22.3	138.7	66 37.5	140.4	65 51.2	142.0	65 04.2	143.5	1 00
0 50	69 43.5	142.0	68 56.0	143.8	68 07.5	145.4	67 18.3	146.9	66 28.0	148.3	0 50
40	71 09.0	148.1	70 17.9	149.6	69 26.4	151.1	68 33.5	152.4	67 40.4	153.7	40
30	72 20.5	154.9	71 26.0	156.3	70 31.0	157.5	69 35.4	158.6	68 39.6	159.6	30
20	73 14.5	162.7	72 17.1	163.7	71 19.7	164.6	70 21.7	165.4	69 23.6	166.1	20
10	73 48.4	171.2	72 49.1	171.7	71 49.7	172.1	70 50.3	172.5	69 50.8	172.9	10
0 00	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 51.1	105.2	0 44.3	106.2	0 37.6	107.2	0 30.8	108.1	0 24.1	109.1	5 50
40	3 14.9	105.5	3 07.5	106.5	2 59.9	107.5	2 52.4	108.4	2 44.8	109.4	40
30	5 38.6	105.8	5 30.4	106.8	5 22.2	107.8	5 13.7	108.8	5 05.3	109.8	30
20	8 02.0	106.1	7 53.1	107.1	7 44.0	108.1	7 34.9	109.1	7 25.6	110.1	20
10	10 25.3	106.5	10 15.6	107.5	10 05.7	108.5	9 55.7	109.5	9 45.5	110.5	10
5 00	12 48.1	106.9	12 37.6	107.9	12 27.0	108.9	12 16.1	109.9	12 05.1	110.9	5 00
4 50	15 10.7	107.3	14 59.5	108.4	14 47.9	109.4	14 36.2	110.4	14 24.2	111.4	4 50
40	17 32.8	107.8	17 20.8	108.9	17 08.4	109.9	16 55.7	110.9	16 42.8	111.9	40
30	19 54.7	108.3	19 41.8	109.4	19 28.2	110.4	19 14.8	111.5	19 00.9	112.5	30
20	22 16.0	108.9	22 02.2	110.0	21 48.0	111.0	21 33.4	112.1	21 18.5	113.1	20
10	24 36.9	109.5	24 22.2	110.6	24 07.0	111.6	23 51.3	112.7	23 35.3	113.8	10
4 00	26 57.2	110.2	26 41.5	111.3	26 25.2	112.3	26 08.5	113.4	25 51.5	114.5	4 00
3 50	29 16.9	110.9	29 00.1	112.1	28 42.9	113.1	28 25.1	114.2	28 06.7	115.3	3 50
40	31 35.8	111.7	31 18.0	112.9	30 59.6	114.0	30 40.6	115.1	30 21.2	116.2	40
30	33 54.0	112.6	33 35.1	113.8	33 15.4	114.9	32 55.3	116.0	32 34.5	117.1	30
20	36 11.2	113.5	35 51.1	114.7	35 30.2	115.8	35 08.8	117.0	34 46.7	118.1	20
10	38 27.6	114.6	38 06.1	115.8	37 43.9	116.9	37 21.1	118.1	36 57.6	119.3	10
3 00	40 42.5	115.7	40 19.7	116.9	39 56.2	118.1	39 31.9	119.3	39 07.0	120.5	3 00
2 50	42 56.3	117.0	42 32.0	118.2	42 07.0	119.4	41 41.2	120.6	41 14.6	121.8	2 50
40	45 08.3	118.3	44 42.6	119.6	44 15.9	120.9	43 48.5	122.1	43 20.3	123.3	40
30	47 18.8	119.8	46 51.3	121.2	46 22.9	122.5	45 53.7	123.7	45 23.7	124.9	30
20	49 27.1	121.5	48 57.8	122.9	48 27.6	124.2	47 56.6	125.5	47 24.8	126.7	20
10	51 32.8	123.4	51 01.7	124.8	50 29.7	126.1	49 56.7	127.4	49 22.7	128.7	10
2 00	53 35.9	125.5	53 02.6	126.9	52 28.4	128.3	51 53.4	129.6	51 17.4	130.9	2 00
1 50	55 35.5	127.9	55 00.0	129.3	54 23.6	130.7	53 46.3	132.0	53 08.0	133.3	1 50
40	57 31.2	130.5	56 53.3	131.9	56 14.4	133.3	55 34.8	134.7	54 54.4	136.0	40
30	59 22.1	133.5	58 41.7	135.0	58 00.3	136.3	57 18.3	137.7	56 35.2	139.0	30
20	61 07.2	136.8	60 24.3	138.3	59 40.2	139.6	58 55.6	140.9	58 10.2	142.2	20
10	62 45.7	140.5	62 00.0	142.0	61 13.3	143.3	60 25.9	144.6	59 38.0	145.8	10
1 00	64 16.2	144.8	63 27.5	146.2	62 38.0	147.4	61 48.1	148.6	60 57.5	149.7	1 00
0 50	65 37.1	149.6	64 45.5	150.8	63 53.5	151.9	63 00.7	153.0	62 07.7	154.0	0 50
40	66 46.7	154.8	65 52.4	155.9	64 57.8	156.9	64 13.0	157.7	63 07.8	158.7	40
30	67 43.4	160.6	66 46.7	161.5	65 50.0	162.3	64 53.6	163.0	63 55.6	163.7	30
20	68 25.3	166.8	67 26.9	167.4	66 28.4	168.0	65 29.8	168.5	64 31.2	169.0	20
10	68 51.3	173.3	67 51.7	173.6	66 52.1	173.9	65 52.4	174.2	64 52.7	174.4	10
0 00	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 17.2	110.1	0 10.5	111.1	0 03.6	112.1					5 50
40	2 37.2	110.4	2 29.5	111.4	2 21.7	112.4	2 13.9	113.4	2 06.1	114.4	40
30	4 56.8	110.8	4 48.2	111.7	4 39.4	112.7	4 30.6	113.7	4 21.7	114.7	30
20	7 16.1	111.1	7 06.6	112.1	6 56.9	113.1	6 47.1	114.1	6 37.1	115.1	20
10	9 35.2	111.5	9 24.6	112.5	9 13.8	113.5	9 03.1	114.5	8 51.9	115.5	10
5 00	11 53.7	111.9	11 42.2	112.9	11 30.4	113.9	11 18.5	114.9	11 06.4	115.9	5 00
4 50	14 11.9	112.4	13 59.3	113.4	13 46.5	114.4	13 33.5	115.4	13 20.3	116.4	4 50
40	16 29.5	112.9	16 16.0	114.0	16 02.1	115.0	15 47.9	116.0	15 33.5	117.0	40
30	18 46.7	113.5	18 32.0	114.6	18 17.0	115.6	18 01.7	116.6	17 46.1	117.6	30
20	21 03.1	114.1	20 47.4	115.2	20 31.1	116.2	20 14.7	117.2	19 58.0	118.2	20
10	23 18.8	114.8	23 02.0	115.9	22 44.6	116.9	22 27.0	117.9	22 08.8	119.0	10
4 00	25 33.8	115.6	25 15.8	116.6	24 57.2	117.7	24 38.3	118.7	24 19.0	119.8	4 00
3 50	27 48.0	116.4	27 28.7	117.4	27 08.8	118.5	26 48.6	119.5	26 27.8	120.6	3 50
40	30 01.1	117.3	29 40.6	118.3	29 19.4	119.4	28 57.8	120.5	28 35.7	121.5	40
30	32 13.2	118.2	31 51.2	119.3	31 28.7	120.4	31 05.7	121.5	30 42.1	122.6	30
20	34 24.0	119.3	34 00.7	120.4	33 36.7	121.5	33 12.2	122.6	32 47.1	123.7	20
10	36 33.4	120.5	36 08.6	121.6	35 43.1	122.7	35 17.1	123.8	34 50.4	124.9	10
3 00	38 41.2	121.7	38 14.9	122.8	37 47.8	124.0	37 20.2	125.1	36 51.9	126.2	3 00
2 50	40 47.4	123.0	40 19.3	124.2	39 50.7	125.4	39 21.2	126.5	38 51.2	127.6	2 50
40	42 51.3	124.5	42 21.6	125.7	41 51.1	126.9	41 20.1	128.0	40 48.3	129.1	40
30	44 53.1	126.2	44 21.5	127.4	43 49.1	128.6	43 16.3	129.7	42 42.6	130.8	30
20	46 52.1	128.0	46 18.7	129.2	45 44.4	130.4	45 09.5	131.5	44 33.9	132.7	20
10	48 48.2	130.0	48 12.6	131.2	47 36.4	132.4	46 59.5	133.5	46 21.8	134.7	10
2 00	50 40.7	132.2	50 03.1	133.4	49 24.6	134.6	48 45.7	135.7	48 06.0	136.9	2 00
1 50	52 29.1	134.6	51 49.4	135.8	51 08.7	137.0	50 27.6	138.1	49 45.7	139.3	1 50
40	54 13.0	137.2	53 31.0	138.4	52 48.1	139.6	52 04.7	140.7	51 20.6	141.9	40
30	55 51.5	140.2	55 07.0	141.3	54 21.9	142.5	53 36.2	143.6	52 49.9	144.8	30
20	57 23.9	143.4	56 37.1	144.5	55 49.5	145.6	55 01.6	146.7	54 13.0	147.8	20
10	58 49.2	146.9	57 59.9	148.0	57 10.0	149.1	56 19.9	150.1	55 29.0	151.1	10
1 00	60 06.4	150.8	59 14.9	151.8	58 22.6	152.8	57 30.3	153.7	56 37.4	154.6	1 00
0 50	61 14.4	155.0	60 20.5	155.9	59 26.2	156.8	58 31.9	157.6	57 37.0	158.4	0 50
40	62 12.1	159.5	61 16.4	160.3	60 20.0	161.0	59 23.9	161.7	58 27.3	162.4	40
30	62 58.5	164.3	62 00.7	165.0	61 03.1	165.5	60 05.2	166.1	59 07.2	166.6	30
20	63 32.4	169.4	62 33.5	169.8	61 34.5	170.2	60 35.6	170.6	59 36.5	170.9	20
10	63 53.0	174.7	62 53.3	174.9	61 53.7	175.1	60 53.8	175.3	59 54.1	175.5	10
0 00	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 07.3	89.0	0 14.6	88.0	0 21.9	87.0	0 29.2	86.0	6 00
5 50	2 28.9	90.3	2 36.2	89.3	2 43.4	88.3	2 50.7	87.3	2 57.8	86.3	5 50
40	4 57.8	90.6	5 05.1	89.6	5 12.2	88.6	5 19.4	87.6	5 26.3	86.6	40
30	7 26.7	90.9	7 33.9	89.9	7 41.1	88.9	7 48.1	87.9	7 54.9	86.9	30
20	9 55.5	91.2	10 02.8	90.2	10 09.9	89.2	10 16.9	88.2	10 23.7	87.2	20
10	12 24.4	91.5	12 31.8	90.5	12 38.9	89.5	12 45.8	88.5	12 52.5	87.5	10
5 00	14 53.1	91.9	15 00.5	90.8	15 07.7	89.8	15 14.6	88.8	15 21.1	87.8	5 00
4 50	17 22.0	92.2	17 29.4	91.1	17 36.6	90.1	17 43.5	89.1	17 50.0	88.0	4 50
40	19 50.7	92.5	19 58.3	91.5	20 05.4	90.4	20 12.3	89.4	20 18.7	88.3	40
30	22 19.4	92.9	22 27.1	91.8	22 34.3	90.7	22 01.2	89.7	22 47.5	88.6	30
20	24 48.0	93.3	24 55.8	92.2	25 03.2	91.1	25 10.0	90.0	25 16.4	88.9	20
10	27 16.7	93.6	27 24.6	92.5	27 32.1	91.4	27 39.0	90.3	27 45.2	89.2	10
4 00	29 45.2	94.0	29 53.3	92.9	30 00.8	91.8	30 07.9	90.6	30 14.1	89.5	4 00
3 50	32 14.3	94.4	32 22.1	93.3	32 29.8	92.1	32 36.7	90.9	32 43.1	89.7	3 50
40	34 42.1	94.9	34 50.6	93.7	34 58.4	92.5	35 05.6	91.3	35 11.9	90.0	40
30	37 10.4	95.3	37 19.2	94.1	37 27.2	92.9	37 34.4	91.6	37 40.8	90.3	30
20	39 38.6	95.8	39 47.6	94.5	39 55.8	93.3	40 03.2	92.0	40 09.6	90.7	20
10	42 06.6	96.4	42 16.0	95.0	42 24.6	93.7	42 32.0	92.4	42 38.5	91.0	10
3 00	44 34.5	97.0	44 44.2	95.6	44 53.0	94.2	45 00.7	92.8	45 07.4	91.4	3 00
2 50	47 02.1	97.6	47 12.4	96.1	47 21.4	94.7	47 29.4	93.2	47 36.2	91.7	2 50
40	49 29.6	98.3	49 40.2	96.7	49 49.7	95.2	49 58.1	93.7	50 04.9	92.1	40
30	51 56.8	99.1	52 08.0	97.4	52 18.0	95.8	52 26.4	94.2	52 33.8	92.6	30
20	54 23.7	99.9	54 35.5	98.2	54 46.0	96.5	54 55.0	94.8	55 02.4	93.0	20
10	56 50.2	100.8	57 02.8	99.0	57 13.9	97.2	57 23.2	95.4	57 31.1	93.6	10
2 00	59 16.1	101.9	59 29.5	100.0	59 41.4	98.0	59 51.4	96.1	59 59.6	94.1	2 00
1 50	61 41.4	103.2	61 56.0	101.1	62 08.6	99.0	62 19.4	96.9	62 28.0	94.8	1 50
40	64 06.0	104.6	64 21.7	102.4	64 35.4	100.2	64 47.0	97.9	64 56.3	95.6	40
30	66 29.4	106.4	66 46.6	104.0	67 01.8	101.5	67 14.1	99.0	67 24.2	96.4	30
20	68 51.5	108.5	69 10.5	105.9	69 27.0	103.1	69 41.1	100.4	69 52.2	97.5	20
10	71 11.5	111.1	71 32.8	108.2	71 51.5	105.2	72 07.0	102.1	72 19.5	98.8	10
1 00	73 28.9	114.5	73 53.2	111.2	74 14.2	107.8	74 32.0	104.3	74 46.2	100.6	1 00
0 50	75 42.5	118.8	76 10.0	115.1	76 34.5	111.3	76 55.5	107.2	77 12.0	102.9	0 50
40	77 48.8	124.7	78 21.7	120.6	78 50.9	116.2	79 16.0	111.4	79 36.3	106.3	40
30	79 45.4	132.8	80 24.5	128.4	81 00.5	123.4	81 31.5	117.8	81 57.0	111.5	30
20	81 24.3	144.3	82 11.8	140.1	82 56.3	134.9	83 36.7	128.6	84 11.3	120.8	20
10	82 34.2	160.3	83 30.2	157.3	84 24.8	153.4	85 17.3	148.0	86 06.0	140.2	10
0 00	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 36.5	85.0	0 43.8	84.1	0 51.1	83.1	0 58.3	82.1	1 05.6	81.1	6 00
5 50	3 04.9	85.3	3 11.9	84.3	3 18.9	83.3	3 25.8	82.3	3 32.6	81.3	5 50
40	5 33.2	85.6	5 40.1	84.6	5 46.8	83.6	5 53.5	82.6	5 59.9	81.6	40
30	8 01.8	85.9	8 08.4	84.9	8 14.8	83.9	8 21.1	82.9	8 27.3	81.9	30
20	10 30.3	86.2	10 36.7	85.2	10 42.9	84.2	10 48.9	83.2	10 54.7	82.1	20
10	12 59.0	86.5	13 05.1	85.4	13 11.1	84.4	13 16.7	83.4	13 22.3	82.4	10
5 00	15 27.4	86.7	15 33.6	85.7	15 39.2	84.7	15 44.7	83.6	15 49.8	82.6	5 00
4 50	17 56.2	87.0	18 01.9	85.9	18 07.6	84.9	18 12.6	83.8	18 17.5	82.8	4 50
40	20 24.8	87.3	20 30.6	86.2	20 35.9	85.1	20 40.7	84.1	20 45.2	83.0	40
30	22 53.6	87.5	22 59.1	86.4	23 04.3	85.3	23 08.8	84.3	23 13.1	83.2	30
20	25 22.3	87.8	25 27.8	86.7	25 32.6	85.6	25 37.0	84.5	25 40.8	83.4	20
10	27 50.8	88.0	27 56.3	86.9	28 01.0	85.8	28 05.1	84.6	28 08.8	83.5	10
4 00	30 19.8	88.3	30 25.1	87.1	30 29.6	86.0	30 33.5	84.8	30 36.7	83.7	4 00
3 50	32 48.8	88.6	32 53.8	87.4	32 58.0	86.2	33 01.8	85.0	33 03.8	83.8	3 50
40	35 17.5	88.8	35 22.6	87.6	35 26.6	86.4	35 30.2	85.2	35 32.7	83.9	40
30	37 46.5	89.1	37 51.2	87.8	37 55.3	86.6	37 58.4	85.3	38 00.8	84.0	30
20	40 15.3	89.4	40 20.1	88.1	40 23.9	86.8	40 26.8	85.4	40 28.8	84.1	20
10	42 44.2	89.7	42 48.8	88.3	42 52.5	86.9	42 55.2	85.5	42 57.1	84.2	10
3 00	45 13.0	90.0	45 17.7	88.5	45 21.3	87.1	45 23.8	85.7	45 25.1	84.3	3 00
2 50	47 42.0	90.3	47 46.4	88.8	47 49.9	87.3	47 52.2	85.8	47 53.3	84.3	2 50
40	50 10.7	90.6	50 15.4	89.0	50 18.7	87.5	50 20.7	85.9	50 21.4	84.3	40
30	52 39.8	90.9	52 44.2	89.3	52 47.4	87.6	52 49.1	86.0	52 49.6	84.3	30
20	55 08.5	91.3	55 13.2	89.6	55 16.2	87.8	55 17.7	86.1	55 17.7	84.3	20
10	57 37.4	91.7	57 42.0	89.9	57 45.0	88.0	57 46.2	86.1	57 45.9	84.2	10
2 00	60 06.1	92.1	60 10.9	90.2	60 13.9	88.1	60 14.8	86.1	60 13.8	84.1	2 00
1 50	62 35.0	92.6	62 39.8	90.5	62 44.0	88.3	62 43.3	86.1	62 41.1	83.9	1 50
40	65 03.5	93.2	65 08.7	90.8	65 11.5	88.5	65 11.9	86.1	65 00.0	83.7	40
30	67 32.4	93.9	67 37.4	91.3	67 40.3	88.6	67 40.3	86.0	67 38.1	83.4	30
20	70 00.6	94.6	70 06.4	91.7	70 09.1	88.8	70 08.9	85.8	70 05.6	82.9	20
10	72 29.1	95.5	72 35.0	92.3	72 38.0	88.9	72 37.2	85.6	72 33.7	82.2	10
1 00	74 56.9	96.8	75 04.0	93.0	75 06.7	89.1	75 05.7	85.2	75 00.6	81.3	1 00
0 50	77 24.5	98.4	77 32.2	93.9	77 35.5	89.2	77 34.0	84.6	77 28.0	79.9	0 50
40	79 51.4	100.8	80 00.8	95.2	80 04.5	89.4	80 02.2	83.6	79 53.8	77.9	40
30	82 17.0	104.6	82 29.0	97.2	82 33.5	89.5	82 30.0	81.9	82 19.0	74.4	30
20	84 38.4	111.6	84 55.9	101.1	85 02.2	89.7	84 56.6	78.2	84 39.6	67.7	20
10	86 48.6	128.7	87 19.3	111.8	87 31.1	89.8	87 19.6	67.9	86 49.1	50.9	10
0 00	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 12.7	80.1	1 20.0	79.1	1 27.1	78.1	1 34.3	77.1	1 41.4	76.1	6 00
5 50	3 39.4	80.3	3 46.2	79.4	3 52.9	78.4	3 59.5	77.4	4 06.0	76.4	5 50
40	6 06.2	80.6	6 12.6	79.6	6 18.7	78.6	6 24.8	77.6	6 30.7	76.6	40
30	8 33.2	80.9	8 39.0	79.9	8 44.8	78.9	8 50.3	77.9	8 55.6	76.8	30
20	11 00.3	81.1	11 05.7	80.1	11 10.9	79.1	11 15.9	78.1	11 20.7	77.1	20
10	13 27.4	81.3	13 32.4	80.3	13 37.3	79.3	13 41.7	78.3	13 45.9	77.2	10
5 00	15 54.6	81.6	15 59.3	80.5	16 03.5	79.5	16 07.5	78.5	16 11.1	77.4	5 00
4 50	18 21.9	81.7	18 26.1	80.7	18 30.0	79.6	18 33.4	78.6	18 36.5	77.5	4 50
40	20 49.3	81.9	20 53.1	80.9	20 56.3	79.8	20 59.3	78.7	21 01.8	77.7	40
30	23 16.8	82.1	23 20.1	81.0	23 23.0	79.9	23 25.3	78.8	23 27.3	77.7	30
20	25 44.2	82.3	25 47.2	81.1	25 49.5	80.0	25 51.5	78.9	25 52.8	77.8	20
10	28 11.8	82.4	28 14.3	81.2	28 16.3	80.1	28 17.6	79.0	28 18.3	77.8	10
4 00	30 39.4	82.5	30 41.5	81.3	30 42.8	80.2	30 43.7	79.0	30 43.8	77.8	4 00
3 50	33 07.0	82.6	33 08.7	81.4	33 09.6	80.2	33 09.8	79.0	33 09.4	77.8	3 50
40	35 34.6	82.7	35 35.9	81.5	35 36.3	80.2	35 36.0	79.0	35 34.9	77.8	40
30	38 02.4	82.8	38 03.1	81.5	38 03.2	80.2	38 02.2	79.0	38 00.4	77.7	30
20	40 30.0	82.8	40 30.4	81.5	40 29.7	80.2	40 28.3	78.9	40 25.8	77.6	20
10	42 57.7	82.8	42 57.5	81.5	42 56.5	80.1	42 54.4	78.7	42 51.2	77.4	10
3 00	45 25.5	82.8	45 24.9	81.4	45 23.0	80.0	45 20.3	78.6	45 16.4	77.2	3 00
2 50	47 53.2	82.8	47 52.0	81.3	47 49.7	79.8	47 46.2	78.4	47 41.4	76.9	2 50
40	50 20.9	82.8	50 19.2	81.2	50 16.2	79.6	50 11.9	78.1	50 06.3	76.5	40
30	52 48.7	82.7	52 46.2	81.0	52 42.6	79.3	52 37.4	77.7	52 31.0	76.1	30
20	55 16.2	82.5	55 13.3	80.8	55 08.8	79.0	55 02.8	77.3	54 55.3	75.6	20
10	57 43.7	82.3	57 40.2	80.5	57 34.9	78.6	57 27.9	76.8	57 19.4	74.9	10
2 00	60 11.3	82.1	60 07.0	80.1	60 00.6	78.1	59 52.7	76.1	59 42.8	74.2	2 00
1 50	62 38.6	81.8	62 33.5	79.6	62 26.3	77.4	62 17.0	75.3	62 05.6	73.2	1 50
40	65 06.0	81.3	64 59.9	79.0	64 51.3	76.6	64 40.7	74.3	64 27.7	72.0	40
30	67 33.0	80.7	67 25.7	78.2	67 15.9	75.6	67 03.6	73.1	66 49.0	70.6	30
20	69 59.9	80.0	69 51.3	77.1	69 39.5	74.3	69 25.4	71.5	69 08.4	68.8	20
10	72 26.2	79.0	72 16.0	75.7	72 02.2	72.5	71 45.7	69.4	71 26.0	66.4	10
1 00	74 51.9	77.5	74 39.5	73.8	74 23.4	70.2	74 03.8	66.7	73 41.0	63.4	1 00
0 50	77 16.5	75.5	77 01.4	71.1	76 42.0	67.0	76 18.7	63.0	75 51.5	59.3	0 50
40	79 40.0	72.4	79 20.8	67.2	78 56.6	62.4	78 28.5	57.9	77 55.9	53.7	40
30	82 00.0	67.5	81 35.4	61.1	81 04.4	55.4	80 29.0	50.3	79 50.0	45.9	30
20	84 13.0	58.4	83 38.6	50.6	82 58.7	44.2	82 14.3	39.0	81 26.7	34.6	20
10	86 06.8	39.3	85 18.0	31.6	84 25.6	26.1	83 30.9	22.1	82 34.9	19.1	10
0 00	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 48.4	75.1	1 55.5	74.1	2 02.5	73.1	2 09.5	72.1	2 16.4	71.1	6 00
5 50	4 12.6	75.4	4 18.7	74.4	4 25.1	73.4	4 31.3	72.4	4 37.4	71.4	5 50
40	6 36.6	75.6	6 42.3	74.6	6 47.8	73.6	6 53.2	72.6	6 58.6	71.6	40
30	9 01.1	75.8	9 05.9	74.8	9 10.7	73.8	9 15.3	72.8	9 20.0	71.8	30
20	11 25.2	76.0	11 29.6	75.0	11 33.8	74.0	11 37.7	73.0	11 41.5	72.0	20
10	13 50.1	76.2	13 53.6	75.2	13 56.9	74.2	14 00.1	73.1	14 03.2	72.1	10
5 00	16 14.5	76.4	16 17.5	75.3	16 20.2	74.3	16 22.7	73.3	16 24.8	72.2	5 00
4 50	18 39.4	76.5	18 41.6	75.4	18 43.6	74.4	18 45.3	73.3	18 46.5	72.3	4 50
40	21 03.9	76.6	21 05.7	75.5	21 07.0	74.5	21 07.9	73.4	21 08.4	72.3	40
30	23 29.1	76.6	23 29.9	75.6	23 30.4	74.5	23 30.6	73.4	23 31.0	72.3	30
20	25 53.6	76.7	25 54.0	75.6	25 53.8	74.5	25 53.2	73.4	25 52.0	72.2	20
10	28 18.7	76.7	28 18.2	75.6	28 17.3	74.4	28 15.7	73.3	28 13.7	72.2	10
4 00	30 43.4	76.7	30 42.4	75.5	30 40.7	74.4	30 38.3	73.2	30 35.4	72.0	4 00
3 50	32 08.6	76.6	33 06.4	75.4	33 04.0	74.2	33 00.8	73.1	32 57.0	71.9	3 50
40	35 33.1	76.5	35 30.5	75.3	35 27.2	74.1	35 23.2	72.9	35 18.4	71.6	40
30	37 58.1	76.4	37 54.5	75.1	37 50.3	73.9	37 45.3	72.6	37 39.6	71.3	30
20	40 22.4	76.2	40 18.4	74.9	40 13.3	73.6	40 07.3	72.3	40 00.5	71.0	20
10	42 47.3	76.0	42 42.0	74.6	42 36.0	73.3	42 29.0	71.9	42 21.2	70.6	10
3 00	45 11.4	75.7	45 05.5	74.3	44 58.5	72.9	44 50.4	71.5	44 41.4	70.1	3 00
2 50	47 35.9	75.4	47 28.7	73.9	47 20.7	72.5	47 11.4	71.0	47 01.1	69.6	2 50
40	49 59.5	75.0	49 51.6	73.4	49 42.4	71.9	49 31.9	70.4	49 20.4	68.9	40
30	52 23.5	74.5	52 14.0	72.8	52 03.6	71.2	51 51.9	69.7	51 38.7	68.1	30
20	54 46.4	73.9	54 36.1	72.2	54 24.3	70.4	54 11.0	68.8	53 56.5	67.1	20
10	57 09.5	73.1	56 57.4	71.3	56 44.1	69.5	56 29.4	67.8	56 13.1	66.0	10
2 00	59 31.3	72.2	59 18.1	70.3	59 03.2	68.4	58 46.6	66.6	58 28.5	64.7	2 00
1 50	61 53.1	71.1	61 37.6	69.1	61 20.9	67.1	61 02.4	65.1	60 42.2	63.2	1 50
40	64 13.0	69.8	63 56.2	67.6	63 37.2	65.5	63 16.5	63.4	62 54.0	61.3	40
30	66 32.5	68.2	66 12.9	65.8	65 51.7	63.5	65 28.3	61.3	65 03.2	59.1	30
20	68 49.2	66.1	68 27.5	63.6	68 03.5	61.1	67 37.3	58.7	67 09.1	56.4	20
10	71 04.5	63.5	70 39.0	60.8	70 12.0	58.1	69 42.3	55.5	69 10.7	53.1	10
1 00	73 15.4	60.2	72 46.9	57.2	72 15.8	54.4	71 42.3	51.7	71 06.9	49.1	1 00
0 50	75 22.5	55.8	74 48.5	52.6	74 13.0	49.6	73 35.3	46.8	72 55.2	44.2	0 50
40	77 20.4	50.0	76 42.2	46.6	76 01.2	43.4	75 18.2	40.6	74 33.3	38.1	40
30	79 09.0	42.0	78 23.0	38.6	77 36.0	35.6	76 47.7	32.9	75 57.3	30.6	30
20	80 36.8	31.1	79 45.3	28.1	78 52.2	25.6	77 58.0	23.5	77 03.2	21.6	20
10	81 38.0	16.8	80 40.4	15.0	79 42.4	13.5	78 44 0	12.3	77 45.4	11.2	10
0 00	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 03. 4	69. 9	0 11. 2	68. 9	0 18. 9	67. 9	0 26. 7	66. 9	0 34. 4	65. 9	6 10
6 00	2 23. 3	70. 1	2 30. 2	69. 1	2 37. 0	68. 2	2 43. 7	67. 2	2 50. 4	66. 2	6 00
5 50	3 43. 4	70. 4	4 49. 4	69. 4	4 55. 2	68. 4	5 01. 2	67. 4	5 06. 7	66. 4	5 50
40	7 03. 8	70. 6	7 08. 9	69. 6	7 13. 9	68. 6	7 18. 6	67. 6	7 23. 2	66. 6	40
30	9 24. 2	70. 8	9 28. 5	69. 8	9 32. 4	68. 8	9 36. 3	67. 8	9 40. 0	66. 8	30
20	11 45. 0	71. 0	11 48. 3	69. 9	11 51. 4	68. 9	11 54. 2	67. 9	11 56. 8	66. 9	20
10	14 05. 7	71. 1	14 08. 2	70. 0	14 10. 2	69. 0	14 12. 2	68. 0	14 13. 8	67. 0	10
5 00	16 26. 6	71. 2	16 28. 2	70. 1	16 29. 3	69. 1	16 30. 2	68. 0	16 30. 8	67. 0	5 00
4 50	18 47. 6	71. 2	18 48. 1	70. 2	18 48. 3	69. 1	18 48. 3	68. 0	18 47. 8	67. 0	4 50
40	21 08. 6	71. 2	21 08. 3	70. 1	21 07. 6	69. 1	21 06. 3	68. 0	21 04. 9	67. 0	40
30	23 29. 3	71. 2	23 28. 2	70. 1	23 26. 4	69. 0	23 24. 4	67. 9	23 21. 7	66. 8	30
20	25 50. 4	71. 1	25 48. 2	70. 0	25 45. 5	68. 9	25 42. 2	67. 8	25 38. 6	66. 7	20
10	28 11. 1	71. 0	28 08. 1	69. 9	28 04. 3	68. 8	28 00. 0	67. 6	27 55. 2	66. 5	10
4 00	30 32. 0	70. 9	30 27. 8	69. 7	30 23. 1	68. 6	30 17. 6	67. 4	30 11. 6	66. 3	4 00
3 50	32 52. 5	70. 7	32 47. 4	69. 5	32 41. 4	68. 3	32 35. 0	67. 1	32 27. 7	66. 0	3 50
40	35 13. 0	70. 4	35 06. 7	69. 2	34 59. 8	68. 0	34 51. 9	66. 8	34 43. 5	65. 6	40
30	37 32. 9	70. 1	37 25. 7	68. 8	37 17. 4	67. 6	37 08. 6	66. 4	36 58. 9	65. 1	30
20	39 53. 0	69. 7	39 44. 4	68. 4	39 35. 1	67. 2	39 24. 6	65. 9	39 13. 6	64. 6	20
10	42 12. 2	69. 3	42 02. 7	68. 0	41 51. 8	66. 6	41 40. 2	65. 3	41 27. 9	64. 0	10
3 00	44 31. 4	68. 7	44 20. 3	67. 4	44 08. 3	66. 0	43 55. 1	64. 7	43 41. 2	63. 3	3 00
2 50	46 49. 7	68. 1	46 37. 3	67. 7	46 23. 8	65. 3	46 09. 3	63. 9	45 53. 7	62. 5	2 50
40	49 07. 6	67. 4	48 53. 8	65. 9	48 38. 8	64. 4	48 22. 4	63. 0	48 05. 2	61. 5	40
30	51 24. 5	66. 5	51 09. 1	65. 0	50 52. 3	63. 4	50 34. 5	61. 9	50 15. 5	60. 4	30
20	53 40. 7	65. 5	53 23. 5	63. 9	53 05. 0	62. 3	52 45. 0	60. 7	52 24. 1	59. 2	20
10	55 55. 4	64. 3	55 36. 5	62. 6	55 15. 9	61. 0	54 54. 1	59. 3	54 31. 1	57. 7	10
2 00	58 09. 0	62. 9	57 47. 9	61. 1	57 25. 3	59. 4	57 01. 0	57. 7	56 35. 8	56. 0	2 00
1 50	60 20. 2	61. 3	59 57. 1	59. 4	59 32. 1	57. 6	59 05. 7	55. 8	58 37. 9	54. 1	1 50
40	62 29. 9	59. 3	62 04. 0	57. 4	61 36. 5	55. 5	61 07. 2	53. 7	60 37. 0	51. 9	40
30	64 36. 2	57. 0	64 07. 6	55. 0	63 37. 1	53. 0	63 05. 4	51. 1	62 32. 0	49. 3	30
20	66 39. 3	54. 2	66 07. 4	52. 1	65 34. 0	50. 1	64 58. 6	48. 1	64 22. 3	46. 3	20
10	68 37. 4	50. 8	68 02. 0	48. 6	67 25. 0	46. 6	66 46. 6	44. 6	66 06. 7	42. 7	10
1 00	70 29. 5	46. 7	69 50. 3	44. 5	69 09. 5	42. 4	68 27. 1	40. 5	67 43. 7	38. 6	1 00
0 50	72 13. 2	41. 8	71 30. 2	39. 6	70 45. 1	37. 5	69 59. 0	35. 6	69 11. 7	33. 8	0 50
40	73 47. 1	35. 8	72 59. 0	33. 7	72 09. 9	31. 7	71 19. 6	30. 0	70 28. 9	28. 4	40
30	75 06. 0	28. 5	74 13. 7	26. 6	73 20. 5	25. 0	72 26. 7	23. 5	71 32. 2	22. 1	30
20	76 07. 6	20. 0	75 11. 4	18. 6	74 14. 8	17. 3	73 17. 5	16. 2	72 20. 1	15. 2	20
10	76 46. 6	10. 4	75 47. 6	9. 6	74 48. 4	8. 9	73 49. 2	8. 3	72 49. 9	7. 8	10
0 00	77 0. 0	0. 0	76 0. 0	0. 0	75 0. 0	0. 0	74 0. 0	0. 0	73 0. 0	0. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 28. 9	90. 3	2 21. 6	91. 3	2 14. 1	92. 3	2 06. 8	93. 3	1 59. 2	94. 3	5 50
40	4 57. 8	90. 6	4 50. 4	91. 6	4 42. 9	92. 6	4 35. 4	93. 6	4 27. 7	94. 6	40
30	7 26. 7	90. 9	7 19. 2	91. 9	7 11. 6	92. 9	7 03. 8	93. 9	6 56. 0	94. 9	30
20	9 55. 5	91. 2	9 47. 9	92. 2	9 40. 3	93. 3	9 32. 5	94. 3	9 24. 4	95. 3	20
10	12 24. 4	91. 5	12 16. 8	92. 5	12 08. 9	93. 6	12 00. 9	94. 6	11 52. 7	95. 6	10
5 00	14 53. 1	91. 9	14 45. 4	92. 9	14 37. 5	93. 9	14 29. 2	94. 9	14 20. 7	96. 0	5 00
4 50	17 22. 0	92. 2	17 14. 1	93. 2	17 05. 9	94. 3	16 57. 5	95. 3	16 48. 8	96. 4	4 50
40	19 50. 7	92. 5	19 42. 7	93. 6	19 34. 4	94. 7	19 25. 7	95. 7	19 16. 6	96. 8	40
30	22 19. 4	92. 9	22 11. 2	94. 0	22 02. 7	95. 0	21 53. 8	96. 1	21 44. 3	97. 2	30
20	24 48. 0	93. 3	24 39. 7	94. 4	24 31. 0	95. 4	24 21. 8	96. 5	24 12. 1	97. 6	20
10	27 16. 7	93. 6	27 08. 2	94. 8	26 59. 1	95. 8	26 49. 6	97. 0	26 39. 6	98. 1	10
4 00	29 45. 2	94. 0	29 36. 5	95. 2	29 27. 2	96. 3	29 17. 4	97. 5	29 06 8	98. 6	4 00
3 50	32 14. 3	94. 4	32 04. 8	95. 6	31 55. 2	96. 8	31 44. 8	98. 0	31 34. 0	99. 1	3 50
40	34 42. 1	94. 9	34 32. 8	96. 1	34 22. 9	97. 3	34 12. 3	98. 5	34 00. 9	99. 7	40
30	37 10. 4	95. 3	37 00. 8	96. 6	36 50. 4	97. 8	36 39. 4	99. 1	36 27. 5	100. 3	30
20	39 38. 6	95. 8	39 28. 7	97. 1	39 17. 9	98. 4	39 06. 3	99. 7	38 53. 9	100. 9	20
10	42 06. 6	96. 4	41 56. 2	97. 7	41 45. 1	99. 0	41 32. 9	100. 3	41 19. 9	101. 6	10
3 00	44 34. 5	97. 0	44 23. 7	98. 3	44 12. 0	99. 7	43 59. 2	101. 1	43 45. 5	102. 4	3 00
2 50	47 02. 1	97. 6	46 50. 9	99. 0	46 38. 4	100. 5	46 25. 1	101. 9	46 10. 8	103. 3	2 50
40	49 29. 6	98. 3	49 17. 7	99. 8	49 04. 8	101. 3	48 50. 7	102. 7	48 35. 3	104. 2	40
30	51 56. 8	99. 1	51 44. 2	100. 6	51 30. 5	102. 2	51 15. 4	103. 7	50 59. 3	105. 3	30
20	54 23. 7	99. 9	54 10. 4	101. 5	53 55. 9	103. 2	53 39. 9	104. 8	53 22. 5	106. 4	20
10	56 50. 2	100. 8	56 36. 0	102. 6	56 20. 4	104. 4	56 03. 4	106. 1	55 44. 9	107. 8	10
2 00	59 16. 1	101. 9	59 01. 0	103. 8	58 44. 3	105. 7	58 25. 9	107. 5	58 06. 0	109. 3	2 00
1 50	61 41. 4	103. 2	61 25. 1	105. 2	61 07. 0	107. 2	60 47. 2	109. 1	60 25. 8	111. 0	1 50
40	64 06. 0	104. 6	63 48. 3	106. 8	63 28. 6	109. 0	63 07. 2	111. 0	62 43. 7	113. 1	40
30	66 29. 4	106. 4	66 10. 0	108. 8	65 48. 5	111. 1	65 24. 9	113. 3	64 59. 5	115. 4	30
20	68 51. 5	108. 5	68 30. 0	111. 1	68 06. 3	113. 6	67 40. 5	116. 0	67 12. 4	118. 3	20
10	71 11. 5	111. 1	70 47. 5	113. 9	70 21. 0	116. 7	69 52. 2	119. 2	69 21. 5	121. 7	10
1 00	73 28. 9	114. 5	73 01. 8	117. 5	72 32. 0	120. 5	71 59. 9	123. 2	71 25. 2	125. 9	1 00
0 50	75 42. 5	118. 8	75 11. 0	122. 2	74 36. 8	125. 4	74 00. 8	128. 3	73 21. 8	131. 0	0 50
40	77 48. 8	124. 7	77 12. 6	128. 3	76 33. 7	131. 7	75 52. 3	134. 8	75 08. 7	137. 5	40
30	79 45. 4	132. 8	79 02. 5	136. 6	78 17. 5	140. 0	77 30. 5	142. 9	76 41. 5	145. 6	30
20	81 24. 3	144. 3	80 34. 3	147. 9	79 42. 6	150. 8	78 49. 5	153. 3	77 55. 2	155. 5	20
10	82 34. 2	160. 3	81 37. 2	162. 6	80 39. 6	164. 4	79 41. 6	165. 9	78 43. 2	167. 1	10
0 00	83 · 0. 0	180. 0	82 0. 0	180. 0	81 0. 0	180. 0	80 0. 0	180. 0	79 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 51.8	95.3	1 44.2	96.3	1 36.7	97.3	1 29.1	98.2	1 21.4	99.2	5 50
40	4 19.9	95.6	4 12.2	96.6	4 04.4	97.6	3 56.4	98.6	3 48.3	99.6	40
30	6 48.1	95.9	6 40.0	96.9	6 31.8	97.9	6 23.5	98.9	6 15.1	99.9	30
20	9 16.1	96.3	9 07.8	97.3	8 59.3	98.3	8 50.6	99.3	8 41.6	100.3	20
10	11 44.2	96.6	11 35.4	97.6	11 26.6	98.6	11 17.3	99.7	11 08.1	100.7	10
5 00	14 11.9	97.0	14 02.9	98.0	13 53.6	99.0	13 44.1	100.1	13 34.3	101.1	5 00
4 50	16 39.6	97.4	16 30.2	98.4	16 20.6	99.4	16 10.6	100.5	16 00.3	101.5	4 50
40	19 07.2	97.8	18 57.5	98.8	18 47.4	99.9	18 36.9	100.9	18 26.0	102.0	40
30	21 34.7	98.2	21 24.4	99.3	21 14.0	100.3	21 02.9	101.4	20 51.6	102.5	30
20	24 01.9	98.7	23 51.4	99.8	23 40.3	100.8	23 28.8	101.9	23 16.8	103.0	20
10	26 29.0	99.2	26 17.9	100.3	26 06.3	101.3	25 54.2	102.4	25 41.6	103.6	10
4 00	28 55.8	99.7	28 44.3	100.8	28 32.2	101.9	28 19.6	103.0	28 06.3	104.2	4 00
3 50	31 22.5	100.2	31 10.2	101.4	30 57.7	102.5	30 44.4	103.7	30 30.5	104.8	3 50
40	33 48.8	100.8	33 36.2	102.0	33 22.9	103.2	33 08.9	104.4	32 54.2	105.5	40
30	36 15.0	101.5	36 01.7	102.7	35 47.7	103.9	35 32.8	105.1	35 17.4	106.3	30
20	38 40.7	102.2	38 26.7	103.4	38 12.0	104.7	37 56.4	105.9	37 40.0	107.1	20
10	41 05.9	102.9	40 51.2	104.2	40 35.6	105.5	40 19.2	106.8	40 02.0	108.0	10
3 00	43 30.9	103.7	43 15.4	105.1	42 58.9	106.4	42 41.5	107.7	42 23.1	109.0	3 00
2 50	45 55.2	104.6	45 38.7	106.0	45 21.3	107.4	45 02.9	108.7	44 43.5	110.1	2 50
40	48 18.9	105.6	48 01.5	107.1	47 43.0	108.5	47 23.5	109.9	47 02.8	111.3	40
30	50 41.9	106.8	50 23.2	108.3	50 03.6	109.8	49 42.7	111.2	49 20.8	112.6	30
20	53 04.0	108.0	52 44.2	109.6	52 23.2	111.2	52 00.9	112.7	51 37.5	114.1	20
10	55 24.9	109.4	55 03.8	111.1	54 41.3	112.7	54 17.5	114.3	53 52.4	115.8	10
2 00	57 44.6	111.0	57 21.9	112.8	56 57.9	114.5	56 32.3	116.1	56 05.3	117.7	2 00
1 50	60 02.8	112.9	59 38.2	114.7	59 12.2	116.5	58 44.8	118.2	58 16.0	119.9	1 50
40	62 18.8	115.0	61 52.4	117.0	61 24.3	118.8	60 54.5	120.6	60 23.3	122.4	40
30	64 32.4	117.5	64 03.4	119.6	63 33.0	121.5	63 00.7	123.4	62 27.3	125.2	30
20	66 42.5	120.5	66 11.1	122.6	65 37.7	124.6	65 02.9	126.6	64 26.2	128.5	20
10	68 48.5	124.0	68 13.8	126.3	67 37.6	128.4	66 59.2	130.4	66 20.0	132.3	10
1 00	70 48.7	128.3	70 10.7	130.6	69 30.6	132.8	68 49.2	134.8	68 06.0	136.7	1 00
0 50	72 41.0	133.6	71 59.0	135.9	71 15.0	138.0	70 29.8	140.1	69 43.3	141.9	0 50
40	74 23.5	140.0	73 36.9	142.3	72 48.7	144.3	71 59.5	146.2	71 08.9	147.9	40
30	75 51.2	147.9	75 00.0	149.8	74 07.7	151.7	73 14.6	153.4	72 20.5	154.9	30
20	77 00.3	157.3	76 04.6	158.9	75 08.5	160.3	74 11.6	161.5	73 14.5	162.6	20
10	77 44.6	168.2	76 45.8	169.1	75 46.8	169.8	75 47.7	170.5	73 48.4	171.1	10
0 00	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 13. 8	100. 2	1 06. 2	101. 2	0 58. 5	102. 2	0 50. 9	103. 2	0 43. 1	104. 2	5 50
40	3 40. 2	100. 6	3 32. 1	101. 6	3 23. 9	102. 5	3 15. 6	103. 5	3 07. 2	104. 5	40
30	6 06. 5	100. 9	5 57. 9	101. 9	5 49. 2	102. 9	5 40. 3	103. 9	5 31. 3	104. 9	30
20	8 32. 6	101. 3	8 23. 5	102. 3	8 14. 1	103. 3	9 04. 7	104. 3	7 55. 0	105. 3	20
10	10 58. 6	101. 7	10 48. 9	102. 7	10 39. 1	103. 7	10 28. 9	104. 7	10 18. 6	105. 7	10
5 00	13 24. 2	102. 1	13 14. 0	103. 1	13 03. 5	104. 1	12 52. 7	105. 1	12 41. 7	106. 1	5 00
4 50	15 49. 7	102. 5	15 38. 9	103. 5	15 27. 8	104. 6	15 16. 4	105. 6	15 04. 7	106. 6	4 50
40	18 14. 8	103. 0	18 03. 6	104. 0	17 51. 6	105. 1	17 39. 6	106. 1	17 27. 1	107. 1	40
30	20 39. 9	103. 5	20 27. 8	104. 5	20 15. 3	105. 6	20 02. 4	106. 6	19 49. 2	107. 7	30
20	23 04. 4	104. 0	22 51. 7	105. 1	22 38. 5	106. 2	22 24. 9	107. 2	22 10. 8	108. 3	20
10	25 28. 8	104. 6	25 15. 2	105. 7	25 01. 3	106. 8	24 46. 9	107. 8	24 31. 9	108. 9	10
4 00	27 52. 6	105. 3	27 38. 4	106. 4	27 23. 5	107. 4	27 08. 3	108. 5	26 52. 4	109. 6	4 00
3 50	30 16. 0	106. 0	30 01. 0	107. 1	29 45. 4	108. 1	29 29. 2	109. 3	29 12. 5	110. 4	3 50
40	32 38. 9	106. 7	32 23. 1	107. 8	32 06. 5	108. 9	31 49. 4	110. 1	31 31. 6	111. 2	40
30	35 01. 3	107. 5	34 44. 4	108. 6	34 27. 1	109. 8	34 08. 9	111. 0	33 50. 1	112. 1	30
20	37 22. 9	108. 3	37 05. 2	109. 5	36 46. 7	110. 7	36 27. 6	111. 9	36 07. 7	113. 0	20
10	39 43. 9	109. 2	39 25. 1	110. 5	39 05. 6	111. 7	38 45. 3	112. 9	38 24. 1	114. 1	10
3 00	42 04. 0	110. 2	41 44. 2	111. 5	41 23. 3	112. 8	41 01. 7	114. 0	40 39. 2	115. 2	3 00
2 50	44 23. 2	111. 4	44 02. 0	112. 7	43 40. 0	114. 0	43 17. 1	115. 3	42 53. 3	116. 5	2 50
40	46 41. 2	112. 7	46 18. 8	114. 0	45 55. 3	115. 3	45 30. 9	116. 7	45 05. 6	117. 9	40
30	48 58. 0	114. 1	48 34. 0	115. 4	48 09. 0	116. 8	47 43. 1	118. 2	47 16. 3	119. 5	30
20	51 12. 9	115. 6	50 47. 6	117. 0	50 21. 0	118. 5	49 53. 3	119. 9	49 24. 7	121. 2	20
10	53 26. 3	117. 4	52 59. 1	118. 8	52 30. 7	120. 3	52 01. 3	121. 7	51 30. 9	123. 1	10
2 00	55 37. 3	119. 3	55 08. 3	120. 8	54 37. 9	122. 3	54 06. 5	123. 8	53 34. 0	125. 2	2 00
1 50	57 45. 8	121. 5	57 14. 6	123. 1	56 42. 2	124. 7	56 08. 6	126. 2	55 33. 9	127. 6	1 50
40	59 51. 0	124. 0	59 17. 5	125. 7	58 42. 7	127. 3	58 06. 8	128. 8	57 29. 5	130. 3	40
30	61 52. 0	126. 9	61 16. 3	128. 6	60 38. 9	130. 2	60 00. 5	131. 8	59 20. 9	133. 3	30
20	63 48. 7	130. 3	63 10. 0	132. 0	62 29. 7	133. 6	61 48. 5	135. 1	61 06. 1	136. 6	20
10	65 39. 2	134. 1	64 57. 3	135. 8	64 14. 0	137. 4	63 30. 0	138. 9	62 44. 9	140. 4	10
1 00	67 22. 1	138. 5	66 37. 1	140. 2	65 50. 6	141. 8	65 03. 5	143. 3	64 15. 4	144. 7	1 00
0 50	68 55. 6	143. 6	68 07. 2	145. 2	67 17. 7	146. 7	66 27. 6	148. 1	65 36. 5	149. 4	0 50
40	70 17. 7	149. 5	69 26. 1	151. 0	68 33. 2	152. 3	67 40. 2	153. 6	66 46. 3	154. 7	40
30	71 25. 8	156. 2	70 31. 0	157. 4	69 35. 1	158. 4	68 39. 5	159. 6	67 43. 3	160. 5	30
20	72 17. 1	163. 6	71 19. 6	164. 5	70 21. 6	165. 3	69 23. 6	166. 0	68 25. 3	166. 7	20
10	72 49. 1	171. 6	71 49. 7	172. 1	70 50. 3	172. 5	69 50. 8	172. 9	68 51. 2	173. 3	10
0 00	73 0. 0	180. 0	72 0. 0	180. 0	71 0. 0	180. 0	70 0. 0	180. 0	69 0. 0	180. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 35.3	105.2	0 27.6	106.2	0 19.8	107.2	0 12.0	108.2	0 04.3	109.2	5 50
40	2 58.9	105.5	2 50.5	106.5	2 41.9	107.5	2 33.4	108.5	2 24.8	109.5	40
30	5 22.3	105.9	5 13.1	106.9	5 03.7	107.9	4 54.4	108.8	4 45.1	109.8	30
20	7 45.2	106.3	7 35.3	107.3	7 25.4	108.3	7 15.2	109.2	7 04.9	110.2	20
10	10 08.1	106.7	9 57.4	107.7	9 46.6	108.7	9 35.6	109.7	9 24.5	110.7	10
5 00	12 30.5	107.1	12 19.1	108.1	12 07.4	109.1	11 55.6	110.1	11 43.5	111.1	5 00
4 50	14 52.7	107.6	14 40.4	108.6	14 27.9	109.6	14 15.1	110.6	14 02.1	111.6	4 50
40	17 14.3	108.1	17 01.3	109.2	16 47.9	110.2	16 34.2	111.2	16 20.2	112.2	40
30	19 35.7	108.7	19 21.7	109.8	19 07.4	110.8	18 52.7	111.8	18 37.8	112.8	30
20	21 56.3	109.3	21 41.5	110.4	21 26.3	111.4	21 10.7	112.4	20 54.7	113.5	20
10	24 16.6	110.0	24 00.8	111.1	23 44.6	112.1	23 27.9	113.1	23 11.0	114.2	10
4 00	26 36.2	110.7	26 19.5	111.8	26 02.3	112.8	25 44.5	113.9	25 26.3	115.0	4 00
3 50	28 55.3	111.5	28 37.3	112.6	28 19.1	113.6	28 00.2	114.7	27 40.9	115.8	3 50
40	31 13.3	112.3	30 54.4	113.4	30 35.0	114.5	30 15.0	115.6	29 54.4	116.7	40
30	33 30.6	113.2	33 10.6	114.4	32 49.9	115.5	32 28.7	116.6	32 07.0	117.7	30
20	35 46.9	114.2	35 25.7	115.4	35 03.8	116.5	34 41.3	117.6	34 18.1	118.7	20
10	38 02.2	115.3	37 39.7	116.5	37 16.4	117.6	36 52.4	118.8	36 28.0	119.9	10
3 00	40 16.1	116.5	39 52.2	117.7	39 27.6	118.8	39 02.2	120.0	38 36.1	121.2	3 00
2 50	42 28.7	117.8	42 03.3	119.0	41 37.2	120.2	41 10.3	121.4	40 42.7	122.6	2 50
40	44 39.4	119.2	44 12.5	120.5	43 44.9	121.7	43 16.2	122.9	42 47.0	124.1	40
30	46 48.5	120.8	46 19.9	122.1	45 50.4	123.3	45 20.2	124.6	44 49.1	125.8	30
20	48 55.1	122.5	48 24.8	123.8	47 53.6	125.1	47 21.4	126.4	46 48.5	127.6	20
10	50 59.4	124.5	50 27.1	125.8	49 53.7	127.1	49 19.7	128.4	48 44.9	129.6	10
2 00	53 00.5	126.6	52 26.2	128.0	51 50.9	129.3	51 14.7	130.6	50 37.7	131.8	2 00
1 50	54 58.3	129.0	54 21.6	130.4	53 44.0	131.7	53 05.7	133.0	52 26.6	134.3	1 50
40	56 51.7	131.7	56 12.8	133.1	55 32.9	134.4	54 52.2	135.7	54 10.7	137.0	40
30	58 40.3	134.7	57 58.9	136.1	57 16.7	137.4	56 33.5	138.7	55 49.7	139.9	30
20	60 23.1	138.0	59 39.0	139.4	58 54.3	140.7	58 08.6	142.0	57 22.3	143.2	20
10	61 58.9	141.8	61 12.3	143.1	60 24.9	144.4	59 36.6	145.6	58 48.0	146.7	10
1 00	63 26.7	146.0	62 37.3	147.4	61 47.3	148.5	60 56.5	149.5	60 05.4	150.6	1 00
0 50	64 45.0	150.6	63 52.9	151.8	63 00.3	152.9	62 07.3	153.9	61 13.7	154.9	0 50
40	65 52.0	155.8	64 57.5	156.8	64 02.6	157.7	63 07.2	158.6	62 11.6	159.4	40
30	66 46.6	161.4	65 49.9	162.2	64 52.7	162.9	63 55.6	163.6	62 58.1	164.2	30
20	67 26.8	167.3	66 28.3	167.9	65 29.7	168.4	64 31.0	168.9	63 32.2	169.3	20
10	67 51.7	173.6	66 52.0	173.9	65 52.4	174.2	64 52.7	174.4	63 53.0	174.6	10
0 00	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 16.2	110.5	2 07.5	111.5	1 58.9	112.5	1 50.0	113.5	1 41.3	114.5	5 40
30	4 35.4	110.8	4 25.9	111.8	4 16.1	112.8	4 06.4	113.8	3 56.6	114.8	30
20	6 54.5	111.2	6 44.0	112.2	6 33.3	113.2	6 22.4	114.2	6 11.6	115.2	20
10	9 13.1	111.7	9 01.6	112.7	8 49.9	113.7	8 38.0	114.7	8 26.3	115.7	10
5 00	11 31.2	112.1	11 18.7	113.1	11 06.1	114.1	10 53.1	115.1	10 40.1	116.1	5 00
4 50	13 48.8	112.6	13 35.4	113.6	13 21.6	114.6	13 07.7	115.6	12 53.4	116.6	4 50
40	16 06.0	113.2	15 51.5	114.2	15 36.7	115.2	15 21.5	116.2	15 06.2	117.2	40
30	18 22.4	113.8	18 06.9	114.8	17 50.9	115.8	17 34.7	116.8	17 18.1	117.8	30
20	20 38.5	114.5	20 21.7	115.5	20 04.6	116.5	19 47.1	117.5	19 29.4	118.5	20
10	22 53.4	115.2	22 35.6	116.3	22 17.3	117.3	21 58.6	118.3	21 39.6	119.3	10
4 00	25 07.8	116.0	24 48.7	117.1	24 29.2	118.1	24 09.3	119.1	23 49.0	120.2	4 00
3 50	27 21.1	116.9	27 00.8	117.9	26 40.0	119.0	26 18.8	120.0	25 57.1	121.1	3 50
40	29 33.5	117.8	29 11.8	118.8	28 49.8	119.9	28 27.1	120.9	28 04.0	122.0	40
30	31 44.4	118.8	31 21.7	119.8	30 58.1	120.9	30 34.1	122.0	30 09.6	123.1	30
20	33 54.5	119.9	33 30.1	120.9	33 05.2	122.0	32 39.5	123.1	32 13.6	124.2	20
10	36 02.8	121.1	35 36.9	122.1	35 10.4	123.2	34 43.4	124.3	34 15.9	125.4	10
3 00	38 09.5	122.3	37 42.1	123.4	37 14.1	124.6	36 45.5	125.7	36 16.2	126.8	3 00
2 50	40 14.1	123.7	39 45.2	124.8	39 15.6	126.0	38 45.1	127.1	38 14.3	128.2	2 50
40	42 17.0	125.3	41 46.3	126.4	41 14.9	127.6	40 42.8	128.7	40 10.1	129.8	40
30	44 17.2	127.0	43 44.8	128.1	43 11.5	129.3	42 37.6	130.4	42 03.1	131.5	30
20	46 14.9	128.8	45 40.5	129.9	45 05.3	131.1	44 29.3	132.2	43 52.9	133.4	20
10	48 09.1	130.8	47 32.9	132.0	46 55.7	133.2	46 17.7	134.3	45 39.4	135.5	10
2 00	50 00.1	133.0	49 21.6	134.2	48 42.4	135.4	48 02.3	136.5	47 21.9	137.6	2 00
1 50	51 46.6	135.5	51 06.0	136.6	50 24.7	137.8	49 42.6	138.9	49 00.0	140.0	1 50
40	53 28.7	138.2	52 45.8	139.3	52 02.2	140.4	51 17.9	141.5	50 33.2	142.6	50
30	55 05.1	141.1	54 19.9	142.2	53 34.1	143.3	52 47.7	144.4	52 00.7	145.5	30
20	56 35.6	144.3	55 47.9	145.4	54 59.9	146.4	54 11.1	147.4	53 22.1	148.5	20
10	57 58.6	147.8	57 08.6	148.9	56 18.4	149.8	55 27.6	150.7	54 36.4	151.7	10
1 00	59 13.9	151.6	58 21.7	152.6	57 29.3	153.5	56 36.2	154.4	55 43.0	155.3	1 00
0 50	60 19.7	155.8	59 25.6	156.6	58 31.0	157.4	57 36.2	158.2	56 41.1	159.0	0 50
40	61 16.0	160.2	60 19.7	160.9	59 23.4	161.6	58 26.6	162.2	57 30.1	162.8	40
30	62 00.5	164.9	61 02.7	165.4	60 04.9	166.0	59 06.9	166.5	58 08.7	166.9	30
20	62 33.4	169.8	61 34.4	170.2	60 35.4	170.5	59 36.1	170.9	58 37.1	171.2	20
10	62 53.3	174.9	61 53.6	175.0	60 53.8	175.2	59 54.0	175.4	58 54.2	175.6	10
0 00	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 08.4	89.0	0 16.7	88.0	0 25.0	87.0	0 33.3	86.0	6 00
5 50	2 28.6	90.3	2 36.9	89.4	2 45.1	88.4	2 53.5	87.4	3 01.6	86.4	5 50
40	4 57.0	90.7	5 05.4	89.7	5 13.6	88.7	5 21.8	87.7	5 29.8	86.7	40
30	7 25.6	91.0	7 33.9	90.0	7 42.1	89.0	7 50.4	88.0	7 58.2	87.0	30
20	9 54.1	91.4	10 02.5	90.4	10 10.7	89.4	10 18.7	88.4	10 26.5	87.4	20
10	12 22.6	91.8	12 31.1	90.8	12 39.2	89.7	12 47.2	88.7	12 54.9	87.7	10
5 00	14 51.0	92.1	14 59.5	91.1	15 07.8	90.1	15 15.7	89.1	15 23.3	88.0	5 00
4 50	17 19.5	92.5	17 28.1	91.5	17 36.4	90.4	17 44.3	89.4	17 51.8	88.3	4 50
40	19 47.9	92.9	19 56.5	91.9	20 04.8	90.8	20 12.7	89.7	20 20.3	88.7	40
30	22 16.2	93.3	22 24.9	92.2	22 33.3	91.2	22 41.4	90.1	22 48.8	89.0	30
20	24 44.4	93.7	24 53.4	92.6	25 01.8	91.5	25 09.8	90.4	25 17.3	89.4	20
10	27 12.6	94.1	27 21.7	93.0	27 30.2	91.9	27 38.4	90.8	27 45.9	89.7	10
4 00	29 40.7	94.6	29 50.0	93.5	29 58.8	92.3	30 06.8	91.2	30 14.4	90 0	4 00
3 50	32 08.8	95.1	32 18.2	93.9	32 27.2	92.7	32 35.5	91.5	32 43.1	90.4	3 50
40	34 36.6	95.6	34 46.4	94.4	34 55.5	93.2	35 03.8	91.9	35 11.5	90.7	40
30	37 04.4	96.1	37 14.5	94.9	37 23.8	93.6	37 32.4	92.4	37 40.1	91.1	30
20	39 32.0	96.7	39 42.5	95.4	39 52.0	94.1	40 00.6	92.8	40 08.5	91.5	20
10	41 59.4	97.3	42 10.2	96.0	42 20.1	94.6	42 29.1	93.3	42 37.0	91.9	10
3 00	44 26.7	97.9	44 37.9	96.6	44 48.1	95.2	44 57.2	93.8	45 05.4	92.4	3 00
2 50	46 53.7	98.6	47 05.4	97.2	47 16.0	95.8	47 25.5	94.3	47 33.8	92.8	2 50
40	49 20.4	99.4	49 32.6	97.9	49 43.7	96.4	49 53.5	94.9	50 02.2	93.3	40
30	51 46.8	100.3	51 59.6	98.7	52 11.2	97.1	52 21.5	95.5	52 30.5	93.9	30
20	54 12.6	101.3	54 26.4	99.6	54 38.5	97.9	54 49.2	96.2	54 58.5	94.5	20
10	56 38.0	102.3	56 52.5	100.6	57 05.4	98.8	57 16.8	97.0	57 26.6	95.2	10
2 00	59 02.9	103.6	59 18.4	101.7	59 32.0	99.8	59 44.1	97.8	59 54.4	95.9	2 00
1 50	61 26.8	105.0	61 43.4	103.0	61 58.2	100.9	62 11.2	98.8	62 22.0	96.7	1 50
40	63 49.8	106.6	64 07.8	104.4	64 23.7	102.2	64 37.5	100.0	64 49.4	97.7	40
30	66 11.4	108.6	66 30.9	106.2	66 48.4	103.8	67 03.6	101.3	67 16.5	98.8	30
20	68 31.2	110.9	68 52.8	108.3	69 12.1	105.7	69 28.7	103.0	69 43.0	100.2	20
10	70 48.6	113.8	71 10.6	111.0	71 34.2	108.1	71 53.2	105.1	72 08.8	101.9	10
1 00	73 02.6	117.5	73 30.0	114.4	73 54.4	111.1	74 15.6	107.7	74 33.5	104.2	1 00
0 50	75 11.6	122.1	75 43.0	118.7	76 11.0	115.1	76 35.8	111.2	76 56.5	107.1	0 50
40	77 13.1	128.3	77 49.5	124.6	78 22.5	120.6	78 51.8	116.1	79 17.0	111.3	40
30	79 03.0	136.6	79 45.5	132.7	80 25.5	128.4	81 01.0	123.4	81 32.5	117.8	30
20	80 34.5	147.9	81 24.4	144.3	82 12.1	140.1	82 56.7	134.9	83 37.1	128.5	20
10	81 37.3	162.6	82 34.2	160.3	83 30.2	157.3	84 24.9	153.4	85 17.4	148.0	10
0 00	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 41.7	85.0	0 50.0	84.1	0 58.3	83.1	1 06.6	82.1	1 14.9	81.1	6 00
5 50	3 09.8	85.4	3 17.8	84.4	3 25.9	83.4	3 33.9	82.4	3 41.6	81.4	5 50
40	5 37.8	85.7	5 45.7	84.7	5 53.5	83.7	6 01.0	82.7	6 08.6	81.7	40
30	8 05.9	86.0	8 13.6	85.0	8 21.1	84.0	8 28.5	83.0	8 35.6	82.0	30
20	10 34.2	86.4	10 41.6	85.4	10 48.9	84.4	10 55.9	83.3	11 02.8	82.3	20
10	13 02.5	86.7	13 09.8	85.7	13 16.7	84.6	13 23.6	83.6	13 30.1	82.6	10
5 00	15 30.8	87.0	15 37.9	86.0	15 44.7	84.9	15 51.1	83.9	15 57.4	82.9	5 00
4 50	17 59.2	87.3	18 06.2	86.3	18 12.6	85.2	18 19.0	84.2	18 24.9	83.1	4 50
40	20 27.5	87.6	20 34.3	86.6	20 40.7	85.5	20 46.8	84.4	20 52.3	83.4	40
30	22 55.9	87.9	23 02.7	86.9	23 08.8	85.8	23 14.7	84.7	23 19.9	83.6	30
20	25 24.4	88.3	25 30.9	87.2	25 37.0	86.0	25 42.5	84.9	25 47.5	83.8	20
10	27 52.9	88.6	27 59.3	87.4	28 05.2	86.3	28 10.5	85.2	28 15.4	84.0	10
4 00	30 21.4	88.9	30 27.7	87.7	30 33.5	86.6	30 38.6	85.4	30 43.1	85.3	4 00
3 50	32 49.9	89.2	32 56.2	88.0	33 01.7	86.8	33 06.7	85.6	33 10.8	84.4	3 50
40	35 18.5	89.5	35 24.6	88.3	35 30.2	87.1	35 34.7	85.9	35 38.7	84.6	40
30	37 47.0	89.9	37 53.1	88.6	37 58.4	87.3	38 03.0	86.1	38 06.6	84.8	30
20	40 15.5	90.2	40 21.6	88.9	40 26.8	87.6	40 31.1	86.3	40 34.6	85.0	20
10	42 44.2	90.6	42 50.1	89.2	42 55.2	87.9	42 59.5	86.5	43 02.5	85.1	10
3 00	45 12.6	91.0	45 18.7	89.6	45 23.8	88.1	45 27.6	86.7	45 30.7	85.3	3 00
2 50	47 41.1	91.4	47 47.2	89.9	47 52.2	88.4	47 56.0	86.9	47 58.6	85.4	2 50
40	50 09.6	91.8	50 15.8	90.2	50 20.7	88.7	50 24.3	87.1	50 26.8	85.5	40
30	52 38.0	92.2	52 44.2	90.6	52 49.1	88.9	52 52.8	87.3	52 54.9	85.6	30
20	55 06.4	92.7	55 12.8	91.0	55 17.7	89.2	55 21.1	87.5	55 22.9	85.7	20
10	57 34.8	93.3	57 41.4	91.4	57 46.1	89.6	57 49.5	87.7	57 51.1	85.8	10
2 00	60 03.1	93.9	60 09.9	91.9	60 14.8	89.9	60 17.9	87.9	60 19.2	85.9	2 00
1 50	62 31.1	94.6	62 38.2	92.4	62 43.3	90.2	62 46.3	88.1	62 47.4	85.9	1 50
40	64 59.2	95.4	65 06.7	93.0	65 11.9	90.6	65 14.8	88.2	65 15.7	85.8	40
30	67 26.8	96.3	67 35.0	93.7	67 40.4	91.1	67 43.2	88.4	67 43.5	85.8	30
20	69 54.6	97.4	70 03.1	94.5	70 08.9	91.5	70 11.8	88.6	70 11.9	85.6	20
10	72 21.4	98.7	72 31.2	95.4	72 37.2	92.1	72 40.2	88.8	72 40.0	85.4	10
1 00	74 48.0	100.5	74 58.7	96.7	75 05.7	92.8	75 08.8	89.0	75 07.9	85.1	1 00
0 50	77 13.0	102.8	77 26.2	98.4	77 34.0	93.8	77 37.4	89.1	77 35.7	84.5	0 50
40	79 37.5	106.2	79 52.5	100.8	80 02.2	95.1	80 05.8	89.3	80 03.5	83.5	40
30	81 58.0	111.5	82 18.0	104.6	82 30.0	97.2	82 34.5	89.5	82 31.0	81.8	30
20	84 11.8	120.8	84 38.9	111.6	84 56.6	101.1	85 02.9	89.6	84 57.3	78.3	20
10	86 06.3	140.2	86 48.8	128.7	87 19.6	111.8	87 31.5	89.8	87 19.9	67.8	10
0 00	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 23.1	80.1	1 31.3	79.1	1 39.5	78.1	1 47.6	77.1	1 55.8	76.1	6 00
5 50	3 49.5	80.4	3 57.4	79.4	4 05.0	78.4	4 12.6	77.4	4 20.1	76.4	5 50
40	6 16.0	80.7	6 23.3	79.7	6 30.5	78.7	6 37.5	77.7	6 44.6	76.7	40
30	8 42.8	81.0	8 49.5	80.0	8 56.3	79.0	9 02.9	78.0	9 09.2	77.0	30
20	11 09.5	81.3	11 15.9	80.3	11 22.2	79.3	11 28.1	78.3	11 34.0	77.3	20
10	13 36.5	81.6	13 42.4	80.6	13 48.2	79.5	13 53.7	78.5	13 59.0	77.5	10
5 00	16 03.4	81.8	16 09.0	80.8	16 14.3	79.8	16 19.3	78.7	16 24.0	77.7	5 00
4 50	18 30.5	82.1	18 35.6	81.0	18 40.6	80.0	18 45.2	78.9	18 49.3	77.9	4 50
40	20 57.6	82.3	21 02.4	81.2	21 06.9	80.2	21 10.8	79.1	21 14.5	78.0	40
30	23 24.9	82.5	23 29.3	81.4	23 33.3	80.3	23 36.8	79.3	23 39.8	78.2	30
20	25 52.2	82.7	25 56.1	81.6	25 59.7	80.5	26 02.7	79.4	26 05.2	78.3	20
10	28 19.5	83.9	28 23.1	81.8	28 26.1	80.6	28 28.8	79.5	28 30.7	78.4	10
4 00	30 47.0	83.1	30 50.2	81.9	30 52.8	80.8	30 54.8	79.6	30 56.2	78.4	4 00
3 50	33 14.6	83.2	33 17.3	82.1	33 19.5	80.9	33 21.0	79.7	33 21.7	78.5	3 50
40	35 42.0	83.4	35 44.4	82.2	35 46.1	81.0	35 47.0	79.7	35 47.3	78.5	40
30	38 09.6	83.5	38 11.6	82.3	38 12.8	81.0	38 13.3	79.7	38 12.8	78.4	30
20	40 37.2	83.7	40 38.7	82.3	40 39.6	81.0	40 39.3	79.7	40 38.3	78.4	20
10	43 03.9	83.8	43 06.0	82.4	43 06.2	81.0	43 05.6	79.7	43 03.9	78.3	10
3 00	45 32.5	83.9	45 33.2	82.4	45 33.0	81.0	45 31.6	79.6	45 29.2	78.2	3 00
2 50	48 00.3	83.9	48 00.5	82.4	47 59.7	80.9	47 57.7	79.4	47 54.5	77.9	2 50
40	50 27.9	84.0	50 27.8	82.4	50 26.4	80.8	50 23.6	79.2	50 19.6	77.7	40
30	52 55.6	84.0	52 54.9	82.3	52 53.0	80.7	52 49.5	79.0	52 44.7	77.4	30
20	55 23.4	84.0	55 22.2	82.2	55 19.5	80.5	55 15.2	78.7	55 09.6	77.0	20
10	57 51.1	83.9	57 49.3	82.0	57 45.9	80.2	57 41.0	78.3	57 35.0	76.4	10
2 00	60 18.8	83.8	60 16.3	81.8	60 12.2	79.8	60 06.1	77.8	59 58.4	75.8	2 00
1 50	62 46.5	83.7	62 43.2	81.5	62 38.4	79.3	62 31.3	77.2	62 22.3	75.1	1 50
40	65 14.1	83.5	65 10.2	81.1	65 04.2	78.7	64 55.6	76.4	64 45.3	74.1	40
30	67 41.2	83.1	67 36.7	80.5	67 29.7	77.9	67 20.0	75.4	67 07.7	72.8	30
20	70 09.0	82.7	70 03.2	79.8	69 54.7	76.9	69 43.0	74.0	69 29.0	71.3	20
10	72 36.3	82.1	72 29.2	78.8	72 19.0	75.5	72 05.5	72.3	71 49.0	69.2	10
1 00	75 03.2	81.2	74 54.4	77.3	74 42.0	73.6	74 26.0	70.0	74 06.5	66.5	1 00
0 50	77 30.0	79.9	77 18.7	75.4	77 03.5	71.0	76 44.0	66.8	76 21.0	62.8	0 50
40	79 55.4	77.8	79 41.6	72.4	79 22.4	67.1	78 58.4	62.2	78 29.9	57.7	40
30	82 20.0	74.3	82 01.0	67.4	81 35.7	61.0	81 05.5	55.2	80 30.5	50.2	30
20	84 40.3	67.6	84 13.6	58.3	83 39.4	50.5	82 59.2	44.1	82 14.8	39.0	20
10	86 49.4	50.8	86 07.0	39.2	85 18.2	31.4	84 25.7	26.0	83 31.1	22.0	10
0 00	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 15.4	70.9	6 10
6 00	2 03.8	75.1	2 11.9	74.2	2 19.9	73.2	2 27.9	72.2	2 35.8	71.2	6 00
5 50	4 27.6	75.4	4 34.9	74.5	4 42.1	73.5	4 49.4	72.5	4 56.5	71.5	5 50
40	6 51.4	75.7	6 58.1	74.8	7 04.7	73.8	7 11.2	72.7	7 17.5	71.7	40
30	9 15.4	76.0	9 21.5	75.0	9 27.3	74.0	9 33.1	73.0	9 38.6	72.0	30
20	11 39.6	76.3	11 45.0	75.2	11 50.2	74.2	11 55.3	73.2	12 00.0	72.2	20
10	13 04.0	76.5	14 08.7	75.4	14 13.3	74.4	14 17.4	73.4	14 21.4	72.4	10
5 00	16 28.4	76.7	16 32.5	75.6	16 36.4	74.6	16 39.9	73.5	16 43.0	72.5	5 00
4 50	18 53.0	76.8	18 56.5	75.8	18 59.5	74.7	19 02.3	73.6	19 04.7	72.6	4 50
40	21 17.7	77.0	21 20.5	75.9	21 22.9	74.8	21 24.9	73.7	21 26.5	72.7	40
30	23 42.4	77.1	23 44.6	76.0	23 46.3	74.9	23 47.5	73.8	23 48.2	72.7	30
20	26 07.2	77.2	26 08.7	76.1	26 09.7	74.9	26 10.2	73.8	26 10.1	72.7	20
10	28 32.1	77.2	28 32.8	76.1	28 33.1	74.9	28 32.8	73.8	28 31.9	72.7	10
4 00	30 56.9	77.3	30 57.0	76.1	30 56.6	74.9	30 55.5	73.8	30 53.7	72.6	4 00
3 50	33 21.8	77.3	33 21.3	76.1	33 20.0	74.9	33 18.0	73.7	33 15.3	72.5	3 50
40	35 46.7	77.3	35 45.4	76.0	35 43.3	74.8	35 40.6	73.6	35 37.0	72.3	40
30	38 11.6	77.2	38 09.5	75.9	38 06.5	74.6	38 03.0	73.4	37 58.4	72.1	30
20	40 36.3	77.1	40 33.5	75.8	40 29.8	74.4	40 25.2	73.1	40 19.7	71.8	20
10	43 01.2	76.9	42 57.5	75.6	42 52.9	74.2	42 47.2	72.8	42 40.7	71.5	10
3 00	45 25.7	76.7	45 21.2	75.3	45 15.7	73.9	45 09.0	72.5	45 01.3	71.1	3 00
2 50	47 50.3	76.4	47 44.8	75.0	47 38.2	73.5	47 30.4	72.0	47 21.7	70.6	2 50
40	50 14.6	76.1	50 08.1	74.6	50 00.4	73.0	49 51.5	71.5	49 41.4	70.0	40
30	52 38.6	75.7	52 31.2	74.1	52 22.3	72.4	52 12.2	70.8	52 00.7	69.2	30
20	55 02.4	75.2	54 53.8	73.5	54 43.7	71.8	54 32.2	70.1	54 19.3	68.4	20
10	57 25.9	74.6	57 15.9	72.8	57 04.4	71.0	56 51.4	69.1	56 36.9	67.4	10
2 00	59 48.8	73.8	59 37.5	71.9	59 24.5	70.0	59 09.8	68.1	58 53.5	66.2	2 00
1 50	62 11.2	72.9	61 58.3	70.8	61 43.5	68.8	61 26.9	66.8	61 08.5	64.8	1 50
40	64 32.6	71.8	64 17.9	69.5	64 01.4	67.3	63 42.6	65.2	63 22.0	63.1	40
30	66 53.1	70.3	66 36.4	67.9	66 17.5	65.5	65 56.3	63.2	65 33.1	61.0	30
20	69 12.2	68.5	68 53.1	65.9	68 31.5	63.3	68 07.6	60.8	67 41.6	58.4	20
10	71 29.3	66.2	71 07.3	63.3	70 42.6	60.5	70 15.5	57.8	69 45.9	55.3	10
1 00	73 43.8	63.2	73 18.1	60.0	72 49.6	57.0	72 18.8	54.2	71 45.3	51.4	1 00
0 50	75 53.9	59.1	75 24.0	55.6	74 50.7	52.4	74 15.3	49.4	73 37.2	46.6	0 50
40	77 57.7	53.6	77 22.3	49.8	76 43.8	46.4	76 03.1	43.2	75 19.9	40.4	40
30	79 51.3	45.7	79 09.0	41.8	78 24.0	38.4	77 37.0	35.4	76 48.2	32.7	30
20	81 27.3	34.5	80 37.4	31.0	79 45.8	28.0	78 52.9	25.4	77 58.7	23.3	20
10	82 35.1	19.0	81 38.1	16.8	80 40.5	14.9	79 42.5	13.4	78 44.1	12.2	10
0 00	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 24.1	69.9	0 32.8	68.9	0 41.5	67.9	0 50.2	66.9	0 59.0	65.9	6 10
6 00	2 43.7	70.2	2 51.5	69.2	2 59.3	68.2	3 07.1	67.2	3 14.7	66.2	6 00
5 50	5 03.5	70.5	5 10.5	69.5	5 17.3	68.5	5 24.1	67.5	5 30.8	66.5	5 50
40	7 23.6	70.7	7 29.8	69.7	7 35.7	68.7	7 41.5	67.7	7 47.0	66.7	40
30	9 43.9	71.0	9 49.2	69.9	9 54.2	68.9	9 59.0	67.9	10 03.6	66.9	30
20	12 04.5	71.2	12 08.9	70.1	12 12.9	69.1	12 16.7	68.1	12 20.3	67.1	20
10	14 25.1	71.3	14 28.6	70.3	14 31.7	69.2	14 34.6	68.2	14 37.2	67.2	10
5 00	16 45.8	71.4	16 48.5	70.4	16 50.7	69.4	16 52.6	68.3	16 54.2	67.3	5 00
4 50	19 06.7	71.5	19 08.4	70.5	19 09.7	69.4	19 10.6	68.4	19 11.2	67.3	50
40	21 27.6	71.6	21 28.5	70.5	21 28.8	69.4	21 28.7	68.4	21 28.2	67.3	40
30	23 48.6	71.6	23 48.4	70.5	23 47.8	69.4	23 46.7	68.3	23 45.1	67.2	30
20	26 09.5	71.6	26 08.5	70.5	26 06.9	69.4	26 04.8	68.3	26 02.1	67.2	20
10	28 30.4	71.5	28 28.4	70.4	28 25.7	69.3	28 22.7	68.1	28 18.9	67.0	10
4 00	30 51.2	71.4	30 48.4	70.3	30 44.7	69.1	30 40.5	68.0	30 35.6	66.8	4 00
3 50	33 12.0	71.3	33 08.1	70.1	33 03.3	68.9	32 57.9	67.7	32 52.0	66.5	3 50
40	35 32.6	71.1	35 27.7	69.9	35 21.9	68.7	35 15.4	67.4	35 08.0	66.2	40
30	37 53.0	70.8	37 46.9	69.6	37 40.1	68.3	37 32.2	67.1	37 23.7	65.8	30
20	40 13.3	70.5	40 06.1	69.2	39 57.8	67.9	39 48.9	66.6	39 39.0	65.3	20
10	42 33.1	70.1	42 24.7	68.8	42 15.3	67.4	42 05.0	66.1	41 53.6	64.8	10
3 00	44 52.6	69.7	44 43.0	68.3	44 32.2	66.9	44 20.6	65.5	44 07.8	64.2	3 00
2 50	47 11.6	69.1	47 00.6	67.7	46 48.6	66.2	46 35.3	64.8	46 21.1	63.4	2 50
40	49 30.2	68.5	49 17.8	67.0	49 04.1	65.5	48 49.3	64.0	48 33.4	62.5	40
30	51 47.9	67.7	51 33.9	66.1	51 18.7	64.5	51 02.2	63.0	50 44.6	61.4	30
20	54 04.9	66.8	53 49.3	65.1	53 32.3	63.5	53 14.0	61.9	52 54.4	60.3	20
10	56 20.7	65.7	56 03.4	63.9	55 44.5	62.3	55 24.1	60.6	55 02.6	58.9	10
2 00	58 35.5	64.4	58 16.2	62.6	57 55.1	60.8	57 32.7	59.1	57 08.7	57.3	2 00
1 50	60 48.5	62.8	60 27.0	60.9	60 03.6	59.1	59 38.7	57.3	59 12.6	55.5	1 50
40	62 59.6	61.0	62 35.7	59.0	62 09.8	57.1	61 42.4	55.3	61 13.4	53.3	40
30	65 08.1	58.8	64 41.2	56.7	64 12.6	54.7	63 42.4	52.7	63 10.6	50.8	30
20	67 13.4	56.1	66 43.6	53.9	66 11.8	51.8	65 38.4	49.8	65 03.2	47.8	20
10	69 14.5	52.9	68 41.0	50.6	68 05.7	48.4	67 28.5	46.3	66 50.2	44.3	10
1 00	71 09.7	48.9	70 32.6	46.5	69 53.2	44.3	69 12.5	42.2	68 30.1	40.2	1 00
0 50	72 57.2	44.0	72 15.5	41.6	71 32.1	39.4	70 47.2	37.3	70 01.2	35.4	0 50
40	74 34.8	37.9	73 48.7	35.5	73 00.5	33.4	72 11.7	31.5	71 21.3	29.8	40
30	75 58.5	30.4	75 07.0	28.3	74 14.7	26.5	73 21.5	24.8	72 27.7	23.3	30
20	77 03.7	21.4	76 08.2	19.9	75 11.8	18.5	74 15.1	17.2	73 18.0	16.1	20
10	77 45.5	11.2	76 46.7	10.3	75 47.7	9.5	74 48.5	8.8	73 49.3	8.2	10
0 00	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	75 0.0	0.0	74 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 28.6	90.3	2 20.2	91.3	2 11.7	92.3	2 03.3	93.3	1 54.8	94.3	5 50
40	4 57.0	90.7	4 48.7	91.7	4 40.1	92.7	4 31.5	93.7	4 22.8	94.7	40
30	7 25.6	91.0	7 17.1	92.0	7 08.4	93.0	6 59.8	94.0	6 50.8	95.0	30
20	9 54.1	91.4	9 45.5	92.4	9 36.8	93.4	9 27.8	94.4	9 18.8	95.4	20
10	12 22.6	91.8	12 13.9	92.8	12 05.0	93.8	11 55.9	94.8	11 46.4	95.8	10
5 00	14 51.1	92.1	14 42.2	93.2	14 33.2	94.2	14 23.9	95.2	14 14.3	96.2	5 00
4 50	17 19.5	92.5	17 10.6	93.6	17 01.3	94.6	16 51.8	95.6	16 41.9	96.6	4 50
40	19 47.9	92.9	19 38.8	94.0	19 29.4	95.0	19 19.5	96.1	19 09.4	97.1	40
30	22 16.2	93.3	22 06.9	94.4	21 57.2	95.4	21 47.2	96.5	21 36.8	97.6	30
20	24 44.4	93.7	24 35.0	94.8	24 25.1	95.9	24 14.7	97.0	24 03.9	98.1	20
10	27 12.6	94.1	27 02.9	95.2	26 52.7	96.4	26 42.1	97.5	26 30.8	98.6	10
4 00	29 40.7	94.6	29 30.8	95.7	29 20.4	96.9	29 09.2	98.0	28 57.6	99.1	4 00
3 50	32 08.8	95.1	31 58.6	96.2	31 47.7	97.4	31 36.3	98.5	31 24.2	99.7	3 50
40	34 36.6	95.6	34 26.1	96.8	34 14.9	98.0	34 03.1	99.1	33 50.5	100.3	40
30	37 04.4	96.1	36 53.6	97.3	36 41.9	98.6	36 29.7	99.8	36 16.5	101.0	30
20	39 32.0	96.7	39 20.8	97.9	39 08.8	99.2	38 55.8	100.5	38 42.1	101.7	20
10	41 59.4	97.3	41 47.8	98.6	41 35.2	99.9	41 21.8	101.2	41 07.2	102.5	10
3 00	44 26.7	97.9	44 14.5	99.3	44 01.4	100.7	43 47.2	102.0	43 32.2	103.3	3 00
2 50	46 53.7	98.6	46 40.9	100.1	46 27.1	101.5	46 12.2	102.9	45 56.3	104.3	2 50
40	49 20.4	99.4	49 07.0	100.9	48 52.5	102.4	48 36.8	103.9	48 20.1	105.3	40
30	51 46.8	100.3	51 32.6	101.9	51 17.2	103.4	51 00.6	104.9	50 43.0	106.5	30
20	54 12.6	101.3	53 57.8	102.9	53 41.5	104.5	53 23.8	106.1	53 04.9	107.7	20
10	56 38.0	102.3	56 22.1	104.1	56 04.8	105.8	55 45.9	107.5	55 25.9	109.2	10
2 00	59 02.9	103.6	58 45.9	105.4	58 27.2	107.2	58 07.1	109.0	57 45.5	110.8	2 00
1 50	61 26.8	105.0	61 08.4	107.0	60 48.4	108.9	60 26.8	110.8	60 03.4	112.6	1 50
40	63 49.8	106.6	63 29.9	108.7	63 08.2	110.8	62 44.6	112.9	62 19.5	114.8	40
30	66 11.4	108.6	65 49.5	110.9	65 25.9	113.1	65 00.2	115.3	64 32.9	117.3	30
20	68 31.2	110.9	68 07.2	113.4	67 41.3	115.8	67 13.0	118.1	66 43.2	120.3	20
10	70 48.6	113.8	70 22.0	116.5	69 53.0	119.1	69 22.0	121.6	68 49.0	123.9	10
1 00	73 02.6	117.5	72 32.8	120.4	72 00.5	123.2	71 25.8	125.8	70 49.2	128.2	1 00
0 50	75 11.6	122.1	74 37.6	125.3	74 01.0	128.2	73 22.2	130.9	72 41.5	133.5	0 50
40	77 13.1	128.3	76 34.1	131.6	75 52.7	134.7	75 09.0	137.4	74 23.7	139.9	40
30	79 03.0	136.6	78 17.5	139.9	77 30.8	142.9	76 41.8	145.5	75 51.5	147.8	30
20	80 34.5	147.8	79 42.7	150.8	78 49.5	153.3	77 55.3	155.5	77 00.3	157.3	20
10	81 37.3	162.6	80 39.7	164.4	79 41.6	165.9	78 43.2	167.1	77 44.6	168.2	10
0 00	82 0.0	180.0	81 0.0	180.0	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 46.2	95.3	1 37.7	96.3	1 29.2	97.3	1 20.5	98.3	1 11.9	99.3	5 50
40	4 14.1	95.7	4 05.3	96.7	3 56.4	97.7	3 47.4	98.6	3 38.3	99.6	40
30	6 41.8	96.0	6 32.8	97.0	6 23.5	98.0	6 14.3	99.0	6 04.7	100.0	30
20	9 09.6	96.4	9 00.1	97.4	8 50.6	98.4	8 40.7	99.4	8 30.9	100.4	20
10	11 37.1	96.8	11 27.4	97.8	11 17.4	98.8	11 07.3	99.8	10 56.9	100.8	10
5 00	14 04.5	97.2	13 54.4	98.3	13 44.1	99.3	13 33.4	100.3	13 22.7	101.3	5 00
4 50	16 31.8	97.6	16 21.4	98.7	16 10.6	99.7	15 59.6	100.8	15 48.2	101.8	4 50
40	18 58.9	98.1	18 48.1	99.2	18 36.9	100.2	18 25.4	101.3	18 13.4	102.3	40
30	21 25.8	98.6	21 14.6	99.7	21 02.9	100.7	20 51.0	101.8	20 38.5	102.8	30
20	23 52.7	99.1	23 41.0	100.2	23 28.8	101.2	23 16.1	102.3	23 03.1	103.4	20
10	26 19.2	99.7	26 07.0	100.7	25 54.4	101.8	25 41.1	102.9	25 27.6	104.0	10
4 00	28 45.5	100.2	28 32.8	101.3	28 19.6	102.4	28 05.7	103.6	27 51.4	104.7	4 00
3 50	31 11.6	100.8	30 58.3	102.0	30 44.3	103.1	30 29.9	104.3	30 14.9	105.4	3 50
40	33 37.3	101.5	33 23.4	102.7	33 08.9	103.8	32 53.6	105.0	32 37.8	106.1	40
30	36 02.6	102.2	35 48.1	103.4	35 32.8	104.6	35 16.9	105.8	35 00.3	106.9	30
20	38 27.7	103.0	38 12.4	104.2	37 56.4	105.4	37 39.5	106.6	37 22.0	107.8	20
10	40 52.2	103.8	40 36.1	105.1	40 19.2	106.3	40 01.6	107.6	39 43.0	108.8	10
3 00	43 16.2	104.7	42 59.3	106.0	42 41.5	107.3	42 22.7	108.6	42 03.2	109.9	3 00
2 50	45 39.6	105.7	45 21.8	107.1	45 02.9	108.4	44 43.1	109.7	44 22.4	111.0	2 50
40	48 02.2	106.7	47 43.4	108.2	47 23.5	109.6	47 02.4	110.9	46 40.5	112.3	40
30	50 23.9	107.9	50 03.9	109.5	49 42.7	110.9	49 20.6	112.3	48 57.3	113.7	30
20	52 44.8	109.2	52 23.5	110.8	52 00.9	112.3	51 37.2	113.8	51 12.4	115.3	20
10	55 04.4	110.8	54 41.5	112.4	54 17.4	114.0	53 52.2	115.5	53 25.9	117.0	10
2 00	57 22.5	112.5	56 58.1	114.2	56 32.3	115.9	56 05.1	117.5	55 36.8	119.0	2 00
1 50	59 38.6	114.5	59 12.4	116.3	58 44.8	118.0	58 15.7	119.6	57 45.4	121.3	1 50
40	61 52.7	116.7	61 24.4	118.6	60 54.5	120.4	60 23.2	122.1	59 50.7	123.8	40
30	64 03.6	119.3	63 33.1	121.3	63 00.9	123.2	62 27.0	125.0	61 51.9	126.7	30
20	66 11.4	122.4	65 37.9	124.5	65 02.9	126.4	64 26.1	128.3	63 48.5	130.1	20
10	68 14.0	126.1	67 37.5	128.2	66 59.2	130.2	66 19.7	132.1	65 39.0	133.9	10
1 00	70 10.8	130.5	69 30.7	132.7	68 49.2	134.7	68 06.1	136.6	67 21.8	138.4	1 00
0 50	71 59.0	135.8	71 15.2	137.9	70 29.8	140.0	69 43.3	141.8	68 55.6	143.5	0 50
40	73 36.9	142.2	72 48.8	144.2	71 59.5	146.1	71 08.8	147.8	70 17.7	149.4	40
30	75 00.0	149.8	74 07.2	151.6	73 14.5	153.3	72 20.5	154.8	71 25.8	156.1	30
20	76 04.6	158.9	75 08.3	160.2	74 11.6	161.5	73 14.5	162.6	72 17.1	163.6	20
10	76 45.7	169.1	75 46.8	169.8	74 47.7	170.5	73 48.4	171.1	72 49.1	171.6	10
0 00	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 03.2	100.3	0 54.5	101.3	0 45.9	102.2	0 37.1	103.2	0 28.3	104.2	5 50
40	3 29.2	100.6	3 20.0	101.6	3 10.8	102.6	3 01.5	103.6	2 52.2	104.6	40
30	5 55.2	101.0	5 45.4	102.0	5 35.8	103.0	5 25.8	104.0	5 15.8	105.0	30
20	8 20.9	101.4	8 10.6	102.4	8 00.3	103.4	7 49.8	104.4	7 39.2	105.4	20
10	10 46.4	101.8	10 35.6	102.8	10 24.8	103.8	10 13.6	104.8	10 02.3	105.8	10
5 00	13 11.6	102.3	13 00.3	103.3	12 48.7	104.3	12 37.0	105.3	12 24.9	106.3	5 00
4 50	15 36.6	102.8	15 24.7	103.8	15 12.6	104.8	15 00.1	105.8	14 47.4	106.8	4 50
40	18 01.3	103.3	17 48.7	104.3	17 36.0	105.4	17 22.7	106.4	17 09.3	107.4	40
30	20 25.7	103.8	20 12.5	104.9	19 59.1	106.0	19 45.2	107.0	19 30.7	108.0	30
20	22 49.8	104.4	22 35.8	105.5	22 21.6	106.6	22 06.9	107.6	21 51.8	108.7	20
10	25 13.4	105.1	24 58.7	106.1	24 43.7	107.2	24 28.3	108.3	24 12.3	109.4	10
4 00	27 36.6	105.8	27 21.2	106.8	27 05.4	107.9	26 48.9	109.0	26 32.1	110.1	4 00
3 50	29 59.4	106.5	29 43.1	107.6	29 26.4	108.7	29 09.2	109.8	28 51.3	110.9	3 50
40	32 21.4	107.3	32 04.4	108.4	31 46.8	109.5	31 28.5	110.7	31 09.7	111.8	40
30	34 43.0	108.1	34 25.1	109.3	34 06.4	110.4	33 47.2	111.6	33 27.3	112.7	30
20	37 03.8	109.0	36 44.8	110.2	36 25.2	111.4	36 04.7	112.6	35 43.7	113.7	20
10	39 23.8	110.0	39 03.8	111.2	38 43.0	112.4	38 21.4	113.6	37 59.3	114.8	10
3 00	41 42.9	111.1	41 21.6	112.4	40 59.7	113.6	40 36.8	114.8	40 13.3	116.0	3 00
2 50	44 01.0	112.3	43 38.4	113.6	43 15.2	114.9	42 51.0	116.1	42 26.0	117.3	2 50
40	46 17.7	113.6	45 53.9	115.0	45 29.2	116.3	45 03.5	117.6	44 37.1	118.8	40
30	48 32.9	115.1	48 07.7	116.5	47 41.5	117.8	47 14.3	119.2	46 46.3	120.4	30
20	50 46.7	116.7	50 19.7	118.1	49 51.8	119.5	49 22.9	120.9	48 53.1	122.2	20
10	52 58.3	118.5	52 29.6	120.0	51 59.8	121.4	51 29.3	122.8	50 57.6	124.1	10
2 00	55 07.6	120.6	54 36.9	122.1	54 05.3	123.5	53 32.6	124.9	52 58.9	126.3	2 00
1 50	57 14.0	122.9	56 41.3	124.4	56 07.5	125.9	55 32.6	127.3	54 56.8	128.7	1 50
40	59 17.0	125.4	58 41.9	127.0	58 05.9	128.5	57 28.5	130.0	56 50.4	131.4	40
30	61 15.7	128.4	60 38.1	130.0	59 59.7	131.5	59 20.0	133.0	58 39.3	134.5	30
20	63 09.4	131.8	62 29.2	133.4	61 47.9	134.9	61 05.4	136.4	60 22.2	137.8	20
10	64 56.8	135.6	64 13.7	137.2	63 29.6	138.8	62 44.3	140.2	61 58.4	141.6	10
1 00	66 36.7	140.1	65 50.3	141.6	65 03.2	143.1	64 14.9	144.5	63 26.2	145.8	1 00
0 50	68 07.2	145.1	67 17.5	146.6	66 27.2	148.0	65 36.1	149.3	64 44.7	150.5	0 50
40	69 25.8	150.9	68 33.0	152.2	67 39.9	153.5	66 46.0	154.6	65 51.8	155.7	40
30	70 30.8	157.3	69 35.2	158.5	68 39.2	159.5	67 43.0	160.4	66 46.5	161.3	30
20	71 19.6	164.5	70 21.6	165.3	69 23.5	166.0	68 25.2	166.7	67 26.7	167.3	20
10	71 49.7	172.1	70 50.5	172.5	69 50.8	172.9	68 51.2	173.2	67 51.6	173.6	10
0 00	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 19.7	105.2	0 10.9	106.2	0 02.1	107.2					5 50
40	2 42.8	105.6	2 33.4	106.6	2 23.9	107.6	2 14.3	108.6	2 04.8	109.5	40
30	5 05.7	106.0	4 55.6	107.0	4 45.3	108.0	4 35.1	109.0	4 24.6	109.9	30
20	7 28.4	106.4	7 17.5	107.4	7 06.5	108.4	6 55.4	109.4	6 44.1	110.3	20
10	9 50.8	106.8	9 39.2	107.8	9 27.3	108.8	9 15.3	109.8	9 03.2	110.8	10
5 00	12 12.7	107.3	12 00.3	108.3	11 47.7	109.3	11 34.8	110.3	11 21.8	111.3	5 00
4 50	14 34.3	107.8	14 21.1	108.8	14 07.6	109.9	13 53.9	110.9	13 39.9	111.9	4 50
40	16 55.5	108.4	16 41.4	109.4	16 27.1	110.5	16 12.4	111.5	15 57.5	112.5	40
30	19 16.2	109.0	19 01.3	110.0	18 45.9	111.1	18 30.4	112.1	18 14.4	113.1	30
20	21 36.3	109.7	21 20.5	110.7	21 04.3	111.8	20 47.7	112.8	20 30.7	113.8	20
10	23 55.9	110.4	23 39.1	111.4	23 21.8	112.5	23 04.3	113.5	22 46.2	114.6	10
4 00	26 14.7	111.2	25 57.0	112.2	25 38.8	113.3	25 20.1	114.3	25 00.8	115.4	4 00
3 50	28 33.0	112.0	28 14.2	113.0	27 54.7	114.1	27 34.9	115.2	27 14.6	116.3	3 50
40	30 50.2	112.9	30 30.3	113.9	30 09.9	115.0	29 48.8	116.1	29 27.3	117.2	40
30	33 06.7	113.8	32 45.6	114.9	32 23.8	116.0	32 01.7	117.1	31 38.8	118.2	30
20	35 22.0	114.9	34 59.7	116.0	34 36.8	117.1	34 13.2	118.2	33 49.1	119.3	20
10	37 36.3	116.0	37 12.6	117.2	36 48.3	118.3	36 23.3	119.4	35 57.7	120.5	10
3 00	39 49.0	117.2	39 24.0	118.4	38 58.3	119.6	38 31.9	120.7	38 04.8	121.8	3 00
2 50	42 00.3	118.6	41 33.8	119.8	41 06.6	121.0	40 38.7	122.1	40 10.0	123.2	2 50
40	44 09.8	120.1	43 41.7	121.3	43 12.9	122.5	42 43.4	123.7	42 13.0	124.8	40
30	46 17.4	121.7	45 47.7	122.9	45 17.0	124.2	44 45.7	125.4	44 13.7	126.5	30
20	48 22.5	123.5	47 51.0	124.8	47 18.7	126.0	46 45.5	127.2	46 11.6	128.4	20
10	50 25.0	125.5	49 51.5	126.8	49 17.2	128.0	48 42.2	129.3	48 06.2	130.5	10
2 00	52 24.3	127.7	51 48.9	129.0	51 12.6	130.2	50 35.4	131.5	49 57.5	132.7	2 00
1 50	54 20.0	130.1	53 42.3	131.4	53 03.7	132.7	52 24.5	134.0	51 44.4	135.2	1 50
40	56 11.2	132.8	55 31.4	134.1	54 50.7	135.4	54 09.0	136.7	53 26.7	137.9	40
30	57 57.6	135.9	57 15.3	137.2	56 32.1	138.4	55 48.1	139.7	55 03.4	140.9	30
20	59 37.9	139.2	58 53.1	140.5	58 07.5	141.7	57 21.0	142.9	56 34.1	144.1	20
10	61 11.3	142.9	60 23.9	144.2	59 35.7	145.4	58 47.0	146.5	57 57.5	147.6	10
1 00	62 36.6	147.1	61 46.6	148.3	60 55.9	149.4	60 04.7	150.4	59 13.0	151.4	1 00
0 50	63 52.4	151.7	62 59.7	152.7	62 06.5	153.7	61 13.3	154.7	60 19.1	155.6	0 50
40	64 57.2	156.7	64 02.2	157.6	63 06.9	158.5	62 11.3	159.3	61 15.4	160.0	40
30	65 49.7	162.1	64 52.6	162.8	63 55.4	163.5	62 58.0	164.2	62 00.2	164.7	30
20	66 28.2	167.8	65 29.6	168.4	64 30.9	168.8	63 32.0	169.3	62 33.3	169.7	20
10	66 52.0	173.9	65 52.4	174.1	64 52.7	174.4	63 53.0	174.6	62 53.3	174.8	10
0 00	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 55.2	110.5	1 45.6	111.5	1 35.9	112.5	1 26.2	113.5	1 16.4	114.5	5 40
30	4 14.1	110.9	4 03.6	111.9	3 52.9	112.9	3 42.2	113.9	3 31.4	114.9	30
20	6 32.7	111.3	6 21.3	112.3	6 09.6	113.3	5 57.9	114.3	5 46.0	115.3	20
10	8 50.8	111.8	8 38.4	112.8	8 25.7	113.8	8 13.0	114.8	8 00.0	115.8	10
5 00	11 08.5	112.3	10 55.1	113.3	10 41.5	114.3	10 27.6	115.3	10 13.6	116.3	5 00
4 50	13 25.7	112.9	13 11.2	113.9	12 56.5	114.9	12 41.6	115.9	12 26.4	116.9	4 50
40	15 42.2	113.5	15 26.8	114.5	15 11.0	115.5	14 55.0	116.5	14 38.6	117.5	40
30	17 58.1	114.1	17 41.6	115.1	17 24.7	116.2	17 07.4	117.2	16 50.0	118.2	30
20	20 13.3	114.8	19 55.7	115.8	19 37.6	116.9	19 19.3	117.9	19 00.5	118.9	20
10	22 27.7	115.6	22 08.9	116.6	21 49.5	117.7	21 30.1	118.7	21 10.1	119.7	10
4 00	24 41.2	116.4	24 21.3	117.4	24 00.8	118.5	23 39.9	119.5	23 18.7	120.6	4 00
3 50	26 53.7	117.3	26 32.6	118.3	26 10.7	119.4	25 48.6	120.4	25 26.0	121.5	3 50
40	29 05.2	118.3	28 42.7	119.3	28 19.6	120.4	27 56.1	121.4	27 32.1	122.5	40
30	31 15.3	119.3	30 51.5	120.4	30 27.1	121.5	30 02.1	122.5	29 36.6	123.6	30
20	33 24.2	120.4	32 59.0	121.5	32 33.0	122.6	32 06.6	123.6	31 39.6	124.7	20
10	35 31.5	121.7	35 05.1	122.8	34 37.3	123.8	34 09.4	124.9	33 40.8	126.0	10
3 00	37 37.1	123.0	37 08.8	124.1	36 39.8	125.2	36 10.2	126.3	35 40.0	127.4	3 00
2 50	39 40.6	124.4	39 10.7	125.5	38 40.1	126.7	38 08.8	127.8	37 36.9	128.9	2 50
40	41 42.0	126.0	41 10.4	127.1	40 38.1	128.3	40 05.0	129.4	39 31.4	130.5	40
30	43 40.8	127.7	43 07.4	128.9	42 33.2	130.0	41 58.5	131.1	41 23.0	132.2	30
20	45 36.9	129.6	45 01.6	130.8	44 25.5	131.9	43 48.8	133.0	43 11.5	134.1	20
10	47 29.6	131.7	46 52.4	132.8	46 14.2	133.9	45 35.6	135.0	44 56.4	136.2	10
2 00	49 18.7	133.9	48 39.5	135.0	47 59.4	136.2	47 18.7	137.3	46 37.3	138.4	2 00
1 50	51 03.6	136.4	50 22.2	137.5	49 39.9	138.6	48 57.1	139.7	48 13.9	140.8	1 50
40	52 43.6	139.0	52 00.1	140.2	51 15.7	141.3	50 30.8	142.3	49 45.3	143.4	40
30	54 18.1	142.0	53 32.2	143.1	52 45.7	144.1	51 58.7	145.1	51 11.1	146.2	30
20	55 46.4	145.2	54 58.4	146.2	54 09.6	147.2	53 20.5	148.2	52 30.8	149.2	20
10	57 07.6	148.6	56 17.2	149.6	55 26.4	150.6	54 35.0	151.5	53 43.5	152.4	10
1 00	58 20.8	152.4	57 28.4	153.3	56 35.3	154.2	55 42.1	155.0	54 48.4	155.8	1 00
0 50	59 25.0	156.5	58 30.4	157.3	57 35.5	158.0	56 40.4	158.7	55 45.1	159.4	0 50
40	60 19.2	160.8	59 23.0	161.4	58 26.3	162.1	57 29.7	162.7	56 32.6	163.3	40
30	61 02.5	165.3	60 04.8	165.8	59 06.6	166.4	58 08.5	166.8	57 10.2	167.3	30
20	61 34.3	170.1	60 35.3	170.4	59 36.2	170.8	58 37.0	171.1	57 37.8	171.5	20
10	61 53.5	175.0	60 53.8	175.2	59 54.0	175.4	58 54.2	175.5	57 54.4	175.7	10
0 00	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 09. 4	89. 0	0 18. 8	88. 0	0 28. 2	87. 0	0 37. 5	86. 1	6 00
5 50	2 28. 2	90. 4	2 37. 6	89. 4	2 46. 8	88. 4	2 56. 2	87. 4	3 05. 3	86. 4	5 50
40	4 56. 3	90. 8	5 05. 7	89. 8	5 15. 0	88. 8	5 24. 1	87. 8	5 33. 2	86. 8	40
30	7 24. 4	91. 2	7 33. 8	90. 2	7 43. 0	89. 2	7 52. 2	88. 2	8 01. 2	87. 2	30
20	9 52. 5	91. 6	10 02. 0	90. 6	10 11. 2	89. 6	10 20. 3	88. 6	10 29. 2	87. 6	20
10	12 20. 6	92. 0	12 30. 1	91. 0	12 39. 4	90. 0	12 48. 4	89. 0	12 57. 2	87. 9	10
5 00	14 48. 6	92. 4	14 58. 2	91. 4	15 07. 5	90. 4	15 16. 5	89. 3	15 25. 3	88. 3	5 00
4 50	17 16. 7	92. 8	17 26. 4	91. 8	17 35. 6	90. 8	17 44. 7	89. 7	17 53. 4	88. 7	4 50
40	19 44. 6	93. 3	19 54. 4	92. 2	20 03. 8	91. 2	20 12. 8	90. 1	20 21. 5	89. 1	40
30	22 12. 5	93. 7	22 22. 4	92. 6	22 31. 8	91. 6	22 41. 1	90. 5	22 49. 7	89. 5	30
20	24 40. 3	94. 2	24 50. 3	93. 1	25 00. 0	92. 0	25 09. 1	90. 9	25 17. 8	89. 8	20
10	27 08. 0	94. 7	27 18. 2	93. 5	27 27. 9	92. 4	27 37. 2	91. 3	27 45. 9	90. 2	10
4 00	29 35. 6	95. 2	29 46. 2	94. 0	29 56. 0	92. 9	30 05. 3	91. 8	30 14. 1	90. 6	4 00
3 50	32 03. 1	95. 7	32 13. 9	94. 5	32 24. 0	93. 4	32 33. 4	92. 2	32 42. 3	91. 0	3 50
40	34 30. 4	96. 3	34 41. 5	95. 1	34 51. 8	93. 9	35 01. 4	92. 7	35 10. 4	91. 4	40
30	36 57. 2	96. 9	37 09. 0	95. 6	37 19. 5	94. 4	37 29. 5	93. 2	37 38. 5	91. 9	30
20	39 24. 6	97. 5	39 36. 4	96. 2	39 47. 2	94. 9	39 57. 3	93. 6	40 06. 5	92. 4	20
10	41 51. 4	98. 2	42 03. 6	96. 8	42 14. 8	95. 5	42 25. 1	94. 2	42 34. 5	92. 9	10
3 00	44 17. 9	98. 9	44 30. 5	97. 5	44 42. 2	96. 2	44 52. 8	94. 8	45 02. 5	93. 4	3 00
2 50	46 44. 2	99. 7	46 57. 2	98. 3	47 09. 3	96. 8	47 20. 5	95. 4	47 30. 2	93. 9	2 50
40	49 10. 0	100. 6	49 23. 8	99. 1	49 36. 4	97. 6	49 47. 8	96. 1	49 58. 0	94. 5	40
30	51 35. 5	101. 5	51 49. 9	100. 0	52 03. 1	98. 4	52 15. 2	96. 8	52 25. 8	95. 2	30
20	54 00. 3	102. 6	54 15. 6	100. 9	54 29. 5	99. 3	54 42. 0	97. 6	54 53. 2	95. 9	20
10	56 24. 5	103. 8	56 40. 8	102. 0	56 55. 5	100. 3	57 08. 8	98. 5	57 20. 4	96. 7	10
2 00	58 48. 0	105. 2	59 05. 3	103. 3	59 21. 0	101. 4	59 35. 0	99. 5	59 47. 5	97. 6	2 00
1 50	61 10. 4	106. 7	61 29. 0	104. 7	61 46. 0	102. 7	62 01. 0	100. 7	62 14. 2	98. 6	1 50
40	63 31. 7	108. 6	63 51. 8	106. 4	64 09. 9	104. 3	64 26. 2	102. 0	64 40. 4	99. 8	40
30	65 51. 2	110. 7	66 13. 0	108. 4	66 33. 0	106. 1	66 50. 6	103. 6	67 06. 1	101. 2	30
20	68 08. 6	113. 3	68 32. 8	110. 8	68 54. 5	108. 2	69 14. 0	105. 6	69 31. 0	102. 8	20
10	70 23. 0	116. 4	70 49. 8	113. 7	71 14. 0	110. 9	71 35. 8	108. 0	71 55. 0	104. 9	10
1 00	72 33. 6	120. 3	73 03. 8	117. 4	73 31. 1	114. 3	73 55. 6	111. 0	74 17. 1	107. 6	1 00
0 50	74 38. 3	125. 2	75 12. 2	122. 0	75 43. 8	118. 7	76 11. 8	115. 0	76 37. 0	111. 1	0 50
40	76 34. 6	131. 6	77 13. 7	128. 2	77 49. 9	124. 6	78 23. 4	120. 6	78 52. 9	116. 1	40
30	78 18. 3	139. 9	79 03. 5	136. 5	79 46. 0	132. 7	80 25. 8	128. 4	81 02. 0	123. 4	30
20	79 42. 9	150. 8	80 34. 6	147. 8	81 24. 7	144. 3	82 12. 5	140. 0	82 57. 1	134. 9	20
10	80 39. 7	164. 4	81 37. 3	162. 6	82 34. 3	160. 3	83 30. 3	157. 3	84 25. 1	153. 4	10
0 00	81 0. 0	180. 0	82 0. 0	180. 0	83 0. 0	180. 0	84 0. 0	180. 0	85 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 46.9	85.1	0 56.2	84.1	1 05.6	83.1	1 14.9	82.1	1 24.2	81.1	6 00
5 50	3 14.6	85.4	3 23.6	84.4	3 32.7	83.5	3 41.7	82.5	3 50.6	81.5	5 50
40	5 42.2	85.8	5 51.1	84.8	5 59.9	83.8	6 08.6	82.9	6 17.2	81.9	40
30	8 10.0	86.2	8 18.7	85.2	8 27.3	84.2	8 35.6	83.2	8 43.9	82.2	30
20	10 37.9	86.6	10 46.4	85.6	10 54.7	84.6	11 02.8	83.5	11 10.8	82.5	20
10	13 05.8	86.9	13 14.2	85.9	13 22.3	84.9	13 30.1	83.9	13 37.7	82.9	10
5 00	15 33.8	87.3	15 41.9	86.3	15 49.8	85.2	15 57.4	84.2	16 04.7	83.2	5 00
4 50	18 01.8	87.6	18 09.8	86.6	18 17.5	85.6	18 24.9	84.5	18 31.8	83.5	4 50
40	20 29.8	88.0	20 37.7	86.9	20 45.2	85.9	20 52.3	84.8	20 59.2	83.8	40
30	22 57.9	88.4	23 05.6	87.3	23 13.1	86.2	23 19.9	85.1	23 26.4	84.0	30
20	25 26.0	88.7	25 33.7	87.6	25 40.8	86.5	25 47.5	85.4	25 53.8	84.3	20
10	27 54.1	89.1	28 01.7	88.0	28 08.8	86.8	28 15.3	85.7	28 21.3	84.6	10
4 00	30 22.3	89.5	30 29.8	88.3	30 36.7	87.2	30 43.1	86.0	30 48.8	84.9	4 00
3 50	32 50.7	89.8	32 57.8	88.6	33 04.8	87.5	33 10.8	86.3	33 16.4	85.1	3 50
40	35 18.6	90.2	35 26.1	89.0	35 32.7	87.8	35 38.7	86.6	35 44.0	85.3	40
30	37 46.8	90.7	37 54.2	89.4	38 00.8	88.1	38 06.6	86.9	38 11.7	85.6	30
20	40 14.8	91.1	40 22.3	89.8	40 28.8	88.5	40 34.6	87.2	40 39.5	85.8	20
10	42 42.9	91.5	42 50.4	90.2	42 57.1	88.8	43 02.6	87.5	43 07.3	86.1	10
3 00	45 11.1	92.0	45 18.7	90.6	45 25.1	89.1	45 30.7	87.7	45 35.1	86.3	3 00
2 50	47 39.1	92.5	47 46.6	91.0	47 53.3	89.5	47 58.6	88.0	48 02.9	86.5	2 50
40	50 07.1	93.0	50 14.9	91.4	50 21.4	89.9	50 26.8	88.3	50 30.9	86.8	40
30	52 35.0	93.5	52 43.0	91.9	52 49.7	90.3	52 54.9	88.6	52 58.8	87.0	30
20	55 02.9	94.1	55 11.0	92.4	55 17.7	90.7	55 22.9	88.9	55 26.7	87.2	20
10	57 30.5	94.8	57 39.0	93.0	57 45.9	91.1	57 51.0	89.3	57 54.6	87.4	10
2 00	59 58.2	95.6	60 06.9	93.6	60 13.8	91.6	60 19.2	89.6	60 22.8	87.6	2 00
1 50	62 25.2	96.5	62 34.8	94.3	62 42.2	92.2	62 47.3	90.0	62 50.7	87.8	1 50
40	64 52.6	97.5	65 02.4	95.1	65 10.0	92.8	65 15.7	90.4	65 18.9	88.0	40
30	67 19.0	98.6	67 29.8	96.1	67 38.2	93.5	67 43.5	90.9	67 46.8	88.2	30
20	69 45.5	100.0	69 57.0	97.2	70 05.6	94.3	70 11.9	91.3	70 15.0	88.4	20
10	72 10.8	101.8	72 23.8	98.6	72 33.7	95.3	72 40.0	91.9	72 43.0	88.6	10
1 00	74 35.3	104.0	74 49.9	100.4	75 00.6	96.6	75 07.9	92.6	75 11.3	88.8	1 00
0 50	76 58.0	107.0	77 14.5	102.7	77 28.0	98.3	77 35.7	93.7	77 39.0	89.0	0 50
40	79 18.1	111.3	79 38.6	106.2	79 53.8	100.7	80 03.5	95.0	80 07.4	89.2	40
30	81 33.0	117.8	81 59.0	111.5	82 19.0	104.5	82 31.0	97.1	82 35.5	89.4	30
20	83 37.6	128.5	84 12.3	120.8	84 39.6	111.6	84 57.3	101.0	85 03.7	89.6	20
10	85 17.6	148.0	86 06.5	140.3	86 49.1	128.7	87 19.9	111.8	87 31.9	89.8	10
0 00	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 33.4	80.1	1 42.6	79.1	1 51.8	78.2	2 01.0	77.2	2 10.2	76.2	6 00
5 50	3 59.5	80.5	4 08.3	79.5	4 16.9	78.5	4 25.6	77.5	4 34.1	76.5	5 50
40	6 25.6	80.9	6 34.0	79.9	6 42.1	78.9	6 50.3	77.9	6 58.2	76.9	40
30	8 51.9	81.2	8 59.8	80.2	9 07.6	79.2	9 15.2	78.2	9 22.7	77.2	30
20	11 18.4	81.5	11 25.9	80.5	11 33.2	79.5	11 40.3	78.5	11 47.1	77.5	20
10	13 45.0	81.8	13 52.2	80.8	13 59.0	79.8	14 05.5	78.8	14 11.9	77.7	10
5 00	16 11.7	82.1	16 18.4	81.1	16 24.8	80.1	16 30.8	79.0	16 36.7	78.0	5 00
4 50	18 38.6	82.4	18 44.8	81.4	18 50.8	80.3	18 56.5	79.3	19 01.7	78.2	4 50
40	21 05.4	82.7	21 11.4	81.6	21 16.8	80.6	21 22.0	79.5	21 26.7	78.4	40
30	23 32.4	82.9	23 38.0	81.9	23 43.1	80.8	23 47.7	79.7	23 52.0	78.6	30
20	25 59.5	83.2	26 04.7	82.1	26 09.3	81.0	26 13.5	79.9	26 17.2	78.8	20
10	28 26.6	83.4	28 31.4	82.3	28 35.7	81.2	28 39.3	80.1	28 42.5	78.9	10
4 00	30 53.9	83.7	30 58.3	82.5	31 02.1	81.4	31 05.3	80.2	31 07.9	79.0	4 00
3 50	33 21.1	83.9	33 25.4	82.7	33 28.6	81.5	33 31.4	80.3	33 33.5	79.1	3 50
40	35 48.5	84.1	35 52.2	82.9	35 55.2	81.7	35 57.4	80.4	35 58.9	77.2	40
30	38 15.9	84.3	38 19.4	83.1	38 21.8	81.8	38 23.5	80.5	38 24.6	79.2	30
20	40 43.3	84.5	40 46.4	82.2	40 48.4	81.9	40 49.6	80.6	40 49.9	79.2	20
10	43 10.9	84.7	43 13.5	83.3	43 15.1	82.0	43 15.8	80.6	43 15.7	79.2	10
3 00	45 38.4	84.9	45 40.7	83.5	45 41.8	82.0	45 41.9	80.6	45 41.0	79.1	3 00
2 50	48 05.9	85.0	48 07.9	83.6	48 08.5	82.0	48 08.3	80.5	48 06.6	79.0	2 50
40	50 33.7	85.2	50 35.1	83.6	50 35.2	82.0	50 34.2	80.4	50 31.9	78.9	40
30	53 01.1	85.3	53 02.3	83.6	53 02.0	82.0	53 00.3	80.3	52 57.3	78.7	30
20	55 28.9	85.4	55 29.5	83.7	55 28.6	81.9	55 26.3	80.1	55 22.4	78.4	20
10	57 56.4	85.5	57 56.9	83.6	57 55.2	81.7	57 52.1	79.8	57 47.5	78.0	10
2 00	60 24.2	85.6	60 24.0	83.6	60 21.8	81.5	60 18.0	79.5	60 12.2	77.5	2 00
1 50	62 52.0	85.6	62 51.2	83.4	62 48.4	81.2	62 43.5	79.1	62 36.8	76.9	1 50
40	65 19.8	85.6	65 18.4	83.2	65 14.7	80.8	65 08.8	78.5	65 00.7	76.1	40
30	67 47.3	85.6	67 45.5	82.9	67 40.8	80.3	67 33.7	77.7	67 24.3	75.1	30
20	70 15.2	85.4	70 12.4	82.5	70 06.7	79.6	69 58.4	76.7	69 47.0	73.9	20
10	72 42.7	85.2	72 39.3	81.9	72 32.0	78.6	72 22.0	75.3	72 08.7	72.1	10
1 00	75 10.5	84.9	75 05.8	81.0	74 56.9	77.1	74 44.8	73.5	74 28.6	69.8	1 00
0 50	77 37.7	84.3	77 32.0	79.7	77 21.0	75.2	77 05.7	70.8	76 46.5	66.6	0 50
40	80 05.2	83.4	79 57.1	77.7	79 43.2	72.2	79 24.1	66.9	79 00.2	62.1	40
30	82 32.0	81.7	82 21.0	74.2	82 02.0	67.2	81 37.0	60.8	81 07.0	55.1	30
20	84 58.1	78.1	84 41.1	67.5	84 14.5	58.2	83 40.1	50.4	82 59.9	43.9	20
10	87 20.2	67.7	86 49.3	50.7	86 07.3	39.1	85 18.5	31.3	84 26.0	25.9	10
0 00	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 05.8	73.8	0 15.6	72.9	0 25.3	71.9	0 35.1	70.9	6 10
6 00	2 19.2	75.2	2 28.3	74.2	2 37.3	73.2	2 46.3	72.2	2 55.2	71.2	6 00
5 50	4 42.6	75.5	4 50.9	74.5	4 59.2	73.5	5 07.4	72.5	5 15.6	71.5	5 50
40	7 06.1	75.9	7 13.8	74.9	7 21.4	73.9	7 28.9	72.8	7 36.3	71.8	40
30	9 29.9	76.2	9 36.9	75.1	9 43.8	74.1	9 50.6	73.1	9 57.1	72.1	30
20	11 53.8	76.5	12 00.2	75.4	12 06.4	74.4	12 12.5	73.4	12 18.3	72.4	20
10	14 18.0	76.7	14 23.7	75.7	14 29.3	74.7	14 34.5	73.6	14 39.4	72.6	10
5 00	16 42.1	77.0	16 47.3	75.9	16 52.2	74.9	16 56.8	73.8	17 00.9	72.8	5 00
4 50	19 06.6	77.2	19 11.0	76.1	19 15.3	75.1	19 19.1	74.0	19 22.6	72.9	4 50
40	21 31.0	77.4	21 35.0	76.3	21 38.5	75.2	21 41.5	74.1	21 44.2	73.0	40
30	23 55.7	77.5	23 58.9	76.4	24 01.7	75.3	24 04.0	74.2	24 05.8	73.1	30
20	26 20.3	77.7	26 22.9	76.5	26 25.1	75.4	26 26.7	74.3	26 27.7	73.2	20
10	28 45.1	77.8	28 47.0	76.6	28 48.4	75.5	28 49.2	74.3	28 49.5	73.2	10
4 00	31 09.8	77.9	31 11.2	76.7	31 11.9	75.5	31 12.0	74.3	31 11.4	73.2	4 00
3 50	33 34.7	77.9	33 35.4	76.7	33 35.3	75.5	33 34.6	74.3	33 33.1	73.1	3 50
40	35 59.6	78.0	35 59.6	76.7	35 58.7	75.5	35 57.2	74.3	35 54.9	73.0	40
30	38 24.6	77.9	38 23.7	76.7	38 22.0	75.4	38 19.7	74.1	38 16.5	72.8	30
20	40 49.4	77.9	40 47.8	76.6	40 45.0	75.3	40 42.3	74.0	40 38.0	72.6	20
10	43 14.3	77.8	43 12.0	76.5	43 08.7	75.1	43 04.4	73.7	42 59.2	72.3	10
3 00	45 39.0	77.7	45 35.9	76.3	45 31.8	74.9	45 26.6	73.4	45 20.3	72.0	3 00
2 50	48 03.7	77.5	47 59.7	76.0	47 54.7	74.6	47 48.4	73.0	47 41.0	71.6	2 50
40	50 28.3	77.3	50 23.4	75.7	50 17.3	74.2	50 10.0	72.6	50 01.5	71.1	40
30	52 52.9	77.0	52 47.0	75.3	52 39.6	73.7	52 31.1	72.0	52 21.4	70.5	30
20	55 17.0	76.6	55 10.1	74.9	55 01.7	73.2	54 52.1	71.4	54 40.7	69.7	20
10	57 41.0	76.1	57 32.9	74.3	57 23.1	72.5	57 12.0	70.6	56 59.1	68.8	10
2 00	60 04.6	75.5	59 55.3	73.6	59 44.2	71.6	59 31.6	69.7	59 16.9	67.8	2 00
1 50	62 27.9	74.7	62 17.0	72.6	62 04.4	70.6	61 49.7	68.5	61 33.4	66.4	1 50
40	64 50.4	73.8	64 38.0	71.5	64 23.5	69.2	64 07.1	67.0	63 48.4	64.9	40
30	67 12.3	72.6	66 57.9	70.1	66 41.3	67.6	66 22.5	65.3	66 01.5	62.9	30
20	69 33.0	71.0	69 16.4	68.3	68 57.3	65.6	68 35.9	63.1	68 12.0	60.6	20
10	71 52.5	69.0	71 33.0	66.0	71 10.7	63.1	70 46.3	60.3	70 19.1	57.6	10
1 00	74 09.6	66.3	73 46.7	63.0	73 21.2	59.8	72 52.9	56.8	72 21.7	53.9	1 00
0 50	76 23.0	62.7	75 56.5	59.0	75 26.3	55.4	74 53.3	52.2	74 18.0	49.1	0 50
40	78 31.8	57.5	77 59.6	53.4	77 23.9	49.6	76 45.8	46.2	76 04.5	43.0	40
30	80 31.5	50.0	79 52.5	45.5	79 10.0	41.6	78 25.0	38.2	77 38.0	35.2	30
20	82 15.5	38.6	81 28.0	34.4	80 38.0	30.8	79 46.5	27.8	78 53.3	25.3	20
10	83 31.3	21.9	82 35.2	19.0	81 38.3	16.7	80 40.7	14.8	79 42.7	13.3	10
0 00	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 44.8	69.9	0 54.5	68.9	1 04.1	67.9	1 13.8	66.9	1 23.4	65.9	6 10
6 00	3 04.0	70.2	3 12.8	69.2	3 21.6	68.3	3 30.3	67.3	3 38.9	66.3	6 00
5 50	5 23.6	70.5	5 31.5	69.6	5 39.3	68.6	5 47.1	67.6	5 54.7	66.6	5 50
40	7 43.5	70.8	7 50.4	69.9	7 57.4	68.9	8 04.2	67.9	8 10.8	66.9	40
30	10 03.3	71.1	10 09.6	70.1	10 15.6	69.1	10 21.4	68.1	10 27.0	67.1	30
20	12 23.8	71.4	12 29.1	70.3	12 34.2	69.3	12 39.1	68.3	12 43.6	67.3	20
10	14 44.1	71.6	14 48.7	70.5	14 52.8	69.5	14 56.7	68.5	15 00.3	67.5	10
5 00	17 04.8	71.7	17 08.4	70.7	17 11.7	69.7	17 14.7	68.6	17 17.3	67.6	5 00
4 50	19 25.5	71.9	19 28.3	70.8	19 30.6	69.7	19 32.6	68.7	19 34.2	67.6	4 50
40	21 46.5	72.0	21 48.2	70.9	21 49.7	69.8	21 50.7	68.7	21 51.2	67.7	40
30	24 07.2	72.0	24 08.2	70.9	24 08.6	69.8	24 08.7	68.7	24 08.2	67.6	30
20	26 28.3	72.1	26 28.2	70.9	26 27.8	69.8	26 26.9	68.7	26 25.2	67.6	20
10	28 49.1	72.1	28 48.2	70.9	28 46.7	69.8	28 44.7	68.6	28 42.2	67.5	10
4 00	31 10.1	72.0	31 08.2	70.8	31 05.8	69.7	31 02.8	68.5	30 59.0	67.3	4 00
3 50	33 31.0	71.9	33 28.1	70.7	33 24.7	69.5	33 20.4	68.3	33 15.5	67.1	3 50
40	35 51.8	71.8	35 47.9	70.5	35 43.4	69.3	35 38.1	68.1	35 32.0	66.8	40
30	38 12.4	71.6	38 07.6	70.3	38 01.7	69.0	37 55.4	67.8	37 48.1	66.5	30
20	40 32.9	71.3	40 26.9	70.0	40 20.1	68.7	40 12.3	67.4	40 03.7	66.1	20
10	42 53.1	71.0	42 46.0	69.7	42 37.9	68.3	42 28.8	67.0	42 18.9	65.6	10
3 00	45 13.1	70.6	45 04.6	69.2	44 55.4	67.8	44 45.0	66.4	44 33.6	65.0	3 00
2 50	47 32.6	70.1	47 23.0	68.7	47 12.2	67.2	47 00.4	65.8	46 47.6	64.3	2 50
40	49 51.7	69.6	49 40.7	68.0	49 28.5	66.5	49 15.2	65.0	49 00.6	63.5	40
30	52 10.1	68.8	51 57.6	67.3	51 43.9	65.6	51 29.0	64.1	51 12.7	62.5	30
20	54 28.0	68.0	54 13.9	66.4	53 58.5	64.7	53 41.8	63.1	53 23.6	61.5	20
10	56 44.9	67.0	56 29.1	65.3	56 11.7	63.6	55 53.1	61.9	55 33.0	60.2	10
2 00	59 00.8	65.9	58 42.9	64.0	58 23.8	62.2	58 03.1	60.4	57 40.6	58.6	2 00
1 50	61 15.1	64.5	60 55.2	62.5	60 33.6	60.6	60 10.7	58.7	59 45.9	56.9	1 50
40	63 28.0	62.8	63 05.6	60.7	62 41.8	58.7	62 16.1	56.7	61 48.6	54.8	40
30	65 38.2	60.7	65 13.4	58.5	64 46.5	56.4	64 18.2	54.3	63 47.9	52.4	30
20	67 46.0	58.2	67 17.9	55.8	66 48.2	53.6	66 16.5	51.5	65 42.9	49.4	20
10	69 49.7	55.0	69 18.2	52.6	68 44.8	50.3	68 09.5	48.1	67 32.5	46.0	10
1 00	71 48.4	51.2	71 12.8	48.6	70 35.6	46.2	69 56.4	44.0	69 15.4	41.9	1 00
0 50	73 39.7	46.3	72 59.7	43.7	72 18.0	41.3	71 34.5	39.1	70 49.5	37.0	0 50
40	75 21.5	40.2	74 36.5	37.7	73 50.3	35.3	73 02.4	33.2	72 13.1	31.2	40
30	76 49.5	32.5	75 59.5	30.2	75 08.0	28.1	74 15.7	26.3	73 22.5	24.6	30
20	77 59.1	23.2	77 04.1	21.3	76 08.5	19.7	75 12.4	18.3	74 15.4	17.0	20
10	78 44.3	12.1	77 45.6	12.1	76 46.8	10.2	75 47.8	9.4	74 48.7	8.8	10
0 00	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	75 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 28.2	90.4	2 18.8	91.4	2 09.2	92.4	1 59.8	93.4	1 50.2	94.4	5 50
40	4 56.3	90.8	4 46.8	91.8	4 37.2	92.8	4 27.6	93.8	4 17.9	94.8	40
30	7 24.4	91.2	7 14.9	92.2	7 05.2	93.2	6 55.5	94.2	6 45.5	95.2	30
20	9 52.5	91.6	9 42.9	92.6	9 33.1	93.6	9 23.2	94.6	9 13.0	95.6	20
10	12 20.6	92.0	12 10.8	93.0	12 00.9	94.0	11 50.8	95.0	11 40.4	96.0	10
5 00	14 48.6	92.4	14 38.8	93.4	14 28.6	94.4	14 18.3	95.5	14 07.7	96.5	5 00
4 50	17 16.7	92.8	17 06.8	93.8	16 56.3	94.9	16 45.8	95.9	16 34.8	96.9	4 50
40	19 44.6	93.3	19 34.5	94.3	19 23.9	95.4	19 13.0	96.4	19 01.8	97.4	40
30	22 12.5	93.7	22 02.1	94.8	21 51.3	95.8	21 40.2	96.9	21 28.6	97.9	30
20	24 40.3	94.2	24 29.7	95.3	24 18.6	96.3	24 07.2	97.4	23 55.3	98.5	20
10	27 08.0	94.7	26 57.2	95.8	26 45.7	96.8	26 34.0	97.9	26 21.7	99.1	10
4 00	29 35.6	95.2	29 24.6	96.3	29 12.8	97.4	29 00.7	98.5	28 47.9	99.7	4 00
3 50	33 03.1	95.7	31 51.8	96.9	31 39.6	98.0	31 27.0	99.1	31 13.8	100.3	3 50
40	34 30.4	96.3	34 18.7	97.5	34 06.3	98.6	33 53.2	99.8	33 39.5	101.0	40
30	36 57.6	96.9	36 45.5	98.1	36 32.6	99.3	36 19.1	100.5	36 04.7	101.7	30
20	39 24.6	97.5	39 12.1	98.8	38 58.7	100.0	38 44.5	101.3	38 29.6	102.5	20
10	41 51.4	98.2	41 38.4	99.5	41 24.6	100.8	41 09.6	102.1	40 53.9	103.4	10
3 00	44 17.9	98.9	44 04.3	100.3	43 49.7	101.6	43 34.3	102.9	43 17.9	104.3	3 00
2 50	46 44.2	99.7	46 29.9	101.1	46 14.6	102.5	45 58.4	103.9	45 41.2	105.3	2 50
40	49 10.0	100.6	48 55.1	102.1	48 39.0	103.5	48 21.9	105.0	48 03.7	106.4	40
30	51 35.5	101.5	51 19.8	103.1	51 02.7	104.6	50 44.6	106.1	50 25.3	107.6	30
20	54 00.3	102.6	53 43.7	104.2	53 25.7	105.8	53 06.5	107.4	52 46.1	109.0	20
10	56 24.5	103.8	56 06.8	105.5	55 47.8	107.2	55 27.2	108.9	55 05.4	110.5	10
2 00	58 48.0	105.2	58 29.1	107.0	58 08.7	108.8	57 46.8	110.5	57 23.5	112.3	2 00
1 50	61 10.4	106.7	60 50.1	108.7	60 28.2	110.6	60 04.6	112.4	59 39.6	114.3	1 50
40	63 31.7	108.6	63 09.8	110.6	62 45.8	112.6	62 20.5	114.6	61 53.5	116.5	40
30	65 51.2	110.7	65 27.2	112.9	65 01.4	115.1	64 33.8	117.2	64 04.5	119.2	30
20	68 08.6	113.3	67 42.5	115.6	67 14.0	118.0	66 43.8	120.2	66 12.0	122.3	20
10	70 23.0	116.4	69 53.8	119.0	69 22.8	121.4	68 49.5	123.8	68 14.5	126.0	10
1 00	72 33.6	120.3	72 01.3	123.0	71 26.4	125.6	70 49.7	128.1	70 11.2	130.4	1 00
0 50	74 38.3	125.2	74 01.5	128.1	73 22.8	130.9	72 41.8	133.4	71 59.1	135.7	0 50
40	76 34.6	131.6	75 53.0	134.6	75 09.4	137.4	74 24.1	139.8	73 37.2	142.1	40
30	78 18.3	139.9	77 31.0	142.8	76 42.0	145.5	75 51.5	147.7	75 00.2	149.8	30
20	79 42.9	150.8	78 49.7	153.3	77 55.4	155.4	77 00.5	157.2	76 04.6	158.8	20
10	80 39.7	164.4	79 41.7	165.9	78 43.3	167.1	77 44.6	168.2	76 45.8	169.1	10
0 00	81 0.0	180.0	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 40.8	95.3	1 31.1	96.3	1 21.4	97.3	1 11.8	98.3	1 02.2	99.3	5 50
40	4 08.2	95.7	3 58.3	96.7	3 48.3	97.7	3 38.3	98.7	3 28.3	99.7	40
30	6 35.5	96.1	6 25.3	97.1	6 15.2	98.1	6 04.8	99.1	5 54.2	100.1	30
20	9 02.8	96.6	8 52.3	97.6	8 41.6	98.6	8 30.9	99.6	8 20.0	100.6	20
10	11 29.9	97.0	11 19.1	98.0	11 08.1	99.0	10 56.8	100.0	10 45.6	101.0	10
5 00	13 56.8	97.5	13 45.7	98.5	13 34.3	99.5	13 22.7	100.5	13 10.8	101.5	5 00
4 50	16 23.7	98.0	16 12.2	99.0	16 00.3	100.0	15 48.3	101.0	15 35.8	102.0	4 50
40	18 50.3	98.5	18 38.3	99.5	18 26.0	100.5	18 13.4	101.6	18 00.7	102.6	40
30	21 16.7	99.0	21 04.3	100.0	20 51.6	101.1	20 38.5	102.2	20 25.0	103.2	30
20	23 43.0	99.6	23 30.1	100.6	23 16.8	101.7	23 03.1	102.8	22 49.1	103.8	20
10	26 08.9	100.2	25 55.5	101.2	25 41.8	102.3	25 27.5	103.4	25 12.8	104.5	10
4 00	28 34.6	100.8	28 20.7	101.9	28 06.3	103.0	27 51.4	104.1	27 36.0	105.2	4 00
3 50	31 00.0	101.4	30 45.5	102.6	30 30.5	103.7	30 14.8	104.8	29 58.7	105.9	3 50
40	33 25.1	102.1	33 10.0	103.3	32 54.2	104.5	32 37.8	105.6	32 20.9	106.7	40
30	35 49.7	102.9	35 33.9	104.1	35 17.4	105.3	34 00.3	106.5	34 42.5	107.6	30
20	38 13.8	103.7	37 57.3	104.9	37 40.0	106.1	37 22.0	107.4	37 03.4	108.5	20
10	40 37.5	104.6	40 20.2	105.9	40 02.0	107.1	39 43.1	108.4	39 23.4	109.6	10
3 00	43 00.6	105.6	42 42.4	106.9	42 23.1	108.2	42 03.2	100 4	41 42.6	110.7	3 00
2 50	45 22.9	106.6	45 03.6	108.0	44 43.5	109.3	44 22.6	110.6	44 00.5	111.9	2 50
40	47 44.5	107.8	47 24.1	109.2	47 02.8	110.6	46 40.5	111.9	46 17.4	113.3	40
30	50 05.0	109.1	49 43.2	110.5	49 20.9	112.0	48 57.3	113.4	48 32.7	114.8	30
20	52 24.5	110.5	52 01.5	112.0	51 37.5	113.5	51 12.4	115.0	50 46.4	116.4	20
10	54 42.4	112.1	54 18.1	113.7	53 52.4	115.3	53 25.8	116.8	52 58.0	118.2	10
2 00	56 58.9	113.9	56 32.8	115.6	56 05.3	117.2	55 36.8	118.8	55 07.4	120.3	2 00
1 50	59 13.1	116.0	58 45.1	117.7	58 16.0	119.4	57 45.4	121.0	57 13.8	122.6	1 50
40	61 25.1	118.4	60 54.9	120.2	60 23.3	121.9	59 50.7	123.6	59 16.9	125.2	40
30	63 33.6	121.1	63 01.1	123.0	62 27.3	124.8	61 51.9	126.5	61 15.6	128.2	30
20	65 38.4	124.3	65 03.1	126.3	64 26.2	128.1	63 48.5	129.9	63 09.3	131.6	20
10	67 38.0	128.1	66 59.6	130.1	66 20.0	132.0	65 39.0	133.8	64 56.7	135.5	10
1 00	69 31.1	132.6	68 49.3	134.6	68 06.0	136.5	67 21.8	138.3	66 36.7	139.9	1 00
0 50	71 15.5	137.8	70 29.8	139.9	69 43.4	141.7	68 55.6	143.4	68 06.8	145.0	0 50
40	72 49.0	144.1	71 59.4	146.1	71 08.9	147.8	70 17.7	149.3	69 25.9	150.8	40
30	74 07.8	151.6	73 14.5	153.3	72 20.5	154.7	71 25.8	156.1	70 30.8	157.3	30
20	75 08.5	160.2	74 11.6	161.5	73 14.5	162.5	72 17.1	163.5	71 19.6	164.4	20
10	75 46.8	169.8	74 47.7	170.5	73 48.4	171.1	72 49.1	171.6	71 49.7	172.1	10
0 00	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 52.6	100.3	0 42.8	101.3	0 33.1	102.2	0 23.4	103.2	0 13.6	104.2	5 50
40	3 18.2	100.7	3 08.0	101.7	2 57.6	102.7	2 47.4	103.6	2 37.1	104.6	40
30	5 43.6	101.1	5 32.8	102.1	5 22.2	103.1	5 11.3	104.0	5 00.3	105.0	30
20	8 08.9	101.6	7 57.7	102.6	7 46.3	103.5	7 34.8	104.5	7 23.1	105.5	20
10	10 33.9	102.0	10 22.2	103.0	10 10.3	104.0	9 58.1	105.0	9 45.8	106.0	10
5 00	12 58.7	102.5	12 46.4	103.5	12 33.8	104.5	12 21.0	105.5	12 08.0	106.5	5 00
4 50	15 23.2	103.0	15 10.3	104.1	14 57.1	105.1	14 43.6	106.1	14 29.9	107.1	4 50
40	17 47.3	103.6	17 33.8	104.7	17 19.8	105.7	17 05.7	106.7	16 51.1	107.7	40
30	20 11.1	104.2	19 56.9	105.3	19 42.4	106.3	19 27.4	107.3	19 12.1	108.3	30
20	22 34.5	104.9	22 19.6	105.9	22 04.3	106.9	21 48.5	108.0	21 32.5	109.0	20
10	24 57.6	105.6	24 41.8	106.6	24 25.8	107.6	24 09.1	108.7	23 52.2	109.7	10
4 00	27 20.1	106.3	27 03.6	107.3	26 46.6	108.4	26 29.2	109.5	26 11.3	110.5	4 00
3 50	29 42.0	107.1	29 24.8	108.1	29 06.9	109.2	28 48.6	110.3	28 29.7	111.4	3 50
40	32 03.4	107.9	31 45.1	109.0	31 26.4	110.1	31 07.1	111.2	30 47.1	112.3	40
30	34 24.1	108.8	34 04.9	109.9	33 45.1	111.1	33 24.7	112.2	33 03.9	113.3	30
20	36 43.9	109.7	36 23.8	110.9	36 02.8	112.1	35 41.4	113.2	35 19.2	114.4	20
10	39 03.0	110.8	38 41.7	112.0	38 19.7	113.2	37 57.0	114.3	37 33.7	115.5	10
3 00	41 20.9	111.9	40 58.5	113.2	40 35.2	114.4	40 11.3	115.6	39 46.6	116.8	3 00
2 50	43 37.7	113.2	43 14.0	114.5	42 49.5	115.7	42 24.3	116.9	41 58.1	118.2	2 50
40	45 53.2	114.6	45 28.1	115.9	45 02.1	117.2	44 35.4	118.4	44 07.8	119.7	40
30	48 07.1	116.1	47 40.5	117.4	47 13.1	118.7	46 44.6	120.0	46 15.5	121.3	30
20	50 19.2	117.8	49 51.0	119.2	49 21.7	120.5	48 51.7	121.8	48 20.8	123.1	20
10	52 29.0	119.7	51 59.1	121.1	51 28.2	122.5	50 56.3	123.8	50 23.5	125.2	10
2 00	54 36.4	121.8	54 04.6	123.2	53 31.6	124.6	52 57.8	126.0	52 22.9	127.4	2 00
1 50	56 40.9	124.1	56 06.8	125.6	55 31.8	127.1	54 55.7	128.5	54 18.8	129.8	1 50
40	58 41.6	126.8	58 05.3	128.3	57 27.8	129.8	56 49.5	131.2	56 10.3	132.6	40
30	60 37.9	129.8	59 59.1	131.3	59 19.3	132.8	58 38.5	134.2	57 56.7	135.6	30
20	62 29.0	133.2	61 47.4	134.7	61 04.9	136.2	60 21.6	137.6	59 37.3	139.0	20
10	64 13.4	137.1	63 29.1	138.6	62 43.9	140.1	61 57.7	141.5	61 10.7	142.8	10
1 00	65 50.2	141.5	65 02.9	143.0	64 14.5	144.4	63 25.8	145.7	62 36.1	146.9	1 00
0 50	67 17.4	146.5	66 27.0	147.9	65 36.0	149.2	64 44.3	150.4	63 52.0	151.5	0 50
40	68 33.0	152.1	67 39.8	153.4	66 45.9	154.5	65 51.6	155.6	64 56.9	156.6	40
30	69 35.2	158.4	68 39.2	159.4	67 42.8	160.3	66 46.3	161.2	65 49.5	162.0	30
20	70 21.6	165.2	69 23.5	165.9	68 25.2	166.6	67 26.7	167.2	66 28.1	167.8	20
10	70 50.3	172.5	69 50.8	172.9	68 51.2	173.2	67 51.6	173.5	66 52.0	173.8	10
0 00	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 03.9	105.2									5 50
40	2 26.7	105.6	2 16.2	106.6	2 05.8	107.6	1 55.3	108.6	1 44.7	109.6	40
30	4 49.3	106.0	4 38.0	107.0	4 26.9	108.0	4 15.5	109.0	4 04.1	110.0	30
20	7 11.5	106.5	6 59.5	107.5	6 47.5	108.5	6 35.5	109.5	6 23.3	110.5	20
10	9 33.4	107.0	9 20.7	108.0	9 07.9	109.0	8 54.9	110.0	8 41.7	111.0	10
5 00	11 54.8	107.5	11 41.3	108.5	11 27.7	109.5	11 13.9	110.5	10 59.9	111.5	5 00
4 50	14 15.9	108.1	14 01.6	109.1	13 47.2	110.1	13 32.4	111.1	13 17.5	112.1	4 50
40	16 36.4	108.7	16 21.4	109.7	16 06.0	110.7	15 50.4	111.7	15 34.4	112.7	40
30	18 56.6	109.4	18 40.5	110.4	18 24.3	111.4	18 07.6	112.4	17 50.7	113.4	30
20	21 16.0	110.1	20 59.0	111.1	20 41.8	112.1	20 24.3	113.1	20 06.3	114.1	20
10	23 34.7	110.8	23 16.9	111.9	22 58.7	112.9	22 40.1	113.9	22 21.1	114.9	10
4 00	25 52.9	111.6	25 34.1	112.7	25 14.8	113.7	24 55.2	114.8	24 35.0	115.8	4 00
3 50	28 10.3	112.5	27 50.4	113.6	27 30.1	114.6	27 09.2	115.7	26 47.7	116.7	3 50
40	30 26.7	113.4	30 05.7	114.5	29 44.2	115.5	29 22.2	116.6	28 59.6	117.7	40
30	32 42.3	114.4	32 20.0	115.5	31 57.3	116.6	31 33.9	117.7	31 10.2	118.8	30
20	34 56.6	115.5	34 33.1	116.6	34 09.1	117.7	33 44.6	118.8	33 19.4	119.9	20
10	37 09.7	116.7	36 44.9	117.8	36 19.7	118.9	35 53.5	120.1	35 26.9	121.2	10
3 00	39 21.3	118.0	38 55.2	119.1	38 28.3	120.2	38 00.9	121.4	37 32.9	122.5	3 00
2 50	41 31.3	119.4	41 03.7	120.5	40 35.4	121.7	40 06.3	122.9	99 36.7	124.0	2 50
40	43 39.4	120.9	43 10.2	122.1	42 40.3	123.3	42 09.8	124.5	41 38.5	125.6	40
30	45 45.5	122.6	45 14.7	123.8	44 43.0	125.0	44 10.6	126.2	43 37.6	127.3	30
20	47 49.1	124.4	47 16.4	125.7	46 42.9	126.9	46 09.0	128.1	45 34.0	129.2	20
10	49 49.7	126.4	49 15.2	127.7	48 39.9	128.9	48 03.7	130.1	47 27.0	131.3	10
2 00	51 47.3	128.7	51 10.7	130.0	50 33.3	131.2	49 55.4	132.4	49 16.4	133.6	2 00
1 50	53 40.9	131.1	53 02.3	132.4	52 22.8	133.7	51 42.5	134.9	51 01.5	136.1	1 50
40	55 30.1	133.9	54 49.2	135.2	54 07.5	136.4	53 25.2	137.6	52 41.9	138.8	40
30	57 14.3	136.9	56 30.9	138.2	55 46.9	139.4	55 02.1	140.6	54 16.7	141.7	30
20	58 52.3	140.3	58 06.5	141.5	57 20.0	142.7	56 33.0	143.8	55 45.3	144.9	20
10	60 23.4	144.0	59 35.0	145.2	58 46.1	146.3	57 56.6	147.4	57 06.6	148.4	10
1 00	61 46.1	148.1	60 55.3	149.2	60 04.0	150.3	59 12.4	151.3	58 20.1	152.2	1 00
0 50	62 59.4	152.6	62 06.3	153.6	61 12.7	154.6	60 18.7	155.4	59 24.6	156.3	0 50
40	64 02.0	157.5	63 06.6	158.4	62 10.9	159.2	61 15.2	159.9	60 18.8	160.6	40
30	64 52.5	162.7	63 55.3	163.4	62 57.7	164.1	62 00.1	164.7	61 02.2	165.2	30
20	65 29.6	168.3	64 30.8	168.8	63 32.0	169.2	62 33.2	169.6	61 34.2	170.0	20
10	65 52.4	174.1	64 52.7	174.3	63 53.0	174.6	62 53.2	174.8	61 53.5	175.0	10
0 00	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 34.2	110.5	1 23.5	111.5	1 13.0	112.5	1 02.3	113.5	0 51.6	114.5	5 40
30	3 52.6	111.0	3 41.3	111.9	3 29.5	112.9	3 17.9	113.9	3 06.2	114.9	30
20	6 10.9	111.4	5 58.3	112.4	5 45.8	113.4	5 33.1	114.4	5 20.3	115.4	20
10	8 28.4	111.9	8 15.1	112.9	8 01.5	113.9	7 47.7	114.9	7 34.0	115.9	10
5 00	10 45.7	112.5	10 31.2	113.5	10 16.7	114.5	10 01.9	115.5	9 47.0	116.5	5 00
4 50	13 02.2	113.1	12 46.9	114.1	12 31.1	115.1	12 15.3	116.1	11 59.3	117.1	4 50
40	15 18.2	113.7	15 01.7	114.7	14 45.1	115.7	14 28.1	116.7	14 10.8	117.7	40
30	17 33.7	114.4	17 15.9	115.4	16 58.0	116.4	16 39.9	117.4	16 21.6	118.4	30
20	19 48.0	115.2	19 29.3	116.2	19 10.5	117.2	18 51.1	118.2	18 31.4	119.2	20
10	22 01.6	116.0	21 41.8	117.0	21 21.7	118.0	21 01.1	119.0	20 40.3	120.0	10
4 00	24 14.4	116.8	23 53.4	117.9	23 32.0	118.9	23 10.3	119.9	22 48.0	120.9	4 00
3 50	26 26.1	117.8	26 03.7	118.8	25 41.2	119.8	25 18.0	120.8	24 54.6	121.9	3 50
40	28 36.6	118.8	28 13.1	119.8	27 49.1	120.8	27 24.7	121.8	26 59.7	122.9	40
30	30 45.8	119.9	30 21.0	120.9	29 55.5	121.9	29 29.7	122.9	29 03.4	124.0	30
20	32 53.7	121.0	32 27.3	122.0	32 00.4	123.1	31 33.2	124.1	31 05.3	125.2	20
10	34 59.7	122.3	34 32.1	123.3	34 03.7	124.4	33 34.7	125.4	33 05.4	126.5	10
3 00	37 04.2	123.6	36 34.8	124.7	36 04.9	125.8	35 34.5	126.8	35 03.5	127.9	3 00
2 50	39 06.5	125.1	38 35.6	126.2	38 03.9	127.3	37 31.8	128.3	36 59.2	129.4	2 50
40	41 06.5	126.7	40 33.9	127.8	40 00.6	128.9	39 26.8	130.0	38 52.3	131.1	40
30	43 03.9	128.5	42 29.4	129.6	41 54.4	130.7	41 18.7	131.8	40 42.6	132.9	30
20	44 58.4	130.4	44 22.1	131.5	43 45.2	132.6	43 07.7	133.7	42 29.5	134.8	20
10	46 49.5	132.5	46 11.3	133.6	45 32.4	134.7	44 53.0	135.8	44 13.0	136.9	10
2 00	48 36.9	134.7	47 56.6	135.8	47 15.9	136.9	46 34.5	138.0	45 52.3	139.1	2 00
1 50	50 19.8	137.2	49 37.5	138.3	48 54.6	139.4	48 11.2	140.4	47 27.2	141.5	1 50
40	51 58.0	139.9	51 13.5	141.0	50 28.6	142.0	49 43.2	143.0	48 57.0	144.0	40
30	53 30.7	142.8	52 44.0	143.9	51 56.8	144.9	51 09.2	145.8	50 21.2	146.8	30
20	54 56.9	146.0	54 08.2	147.0	53 19.1	147.9	52 29.4	148.8	51 39.1	149.8	20
10	56 16.1	149.4	55 25.2	150.4	54 33.9	151.3	53 42.2	152.1	52 50.2	153.0	10
1 00	57 27.5	153.1	56 34.5	154.0	55 41.3	154.8	54 47.6	155.6	53 53.6	156.4	1 00
0 50	58 29.9	157.1	57 34.9	157.9	56 39.9	158.6	55 44.4	159.3	54 48.7	159.9	0 50
40	59 22.6	161.3	58 25.9	162.0	57 29.3	162.6	56 32.3	163.2	55 35.1	163.7	40
30	60 04.5	165.8	59 06.5	166.3	58 08.2	166.8	57 10.0	167.2	56 11.9	167.6	30
20	60 35.2	170.4	59 36.0	170.8	58 36.9	171.1	57 37.7	171.4	56 38.4	171.7	20
10	60 53.7	175.2	59 54.0	175.3	58 54.2	175.5	57 54.4	175.7	56 54.6	175.8	10
0 00	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 10.4	89.0	0 20.8	88.0	0 31.2	87.0	0 41.7	86.1	6 00
5 50	2 27.7	90.4	2 38.1	89.4	2 48.4	88.4	2 58.8	87.5	3 09.0	86.5	5 50
40	4 55.5	90.9	5 05.8	89.9	5 16.1	88.9	5 26.4	87.9	5 36.5	86.9	40
30	7 23.1	91.3	7 33.3	90.3	7 43.8	89.3	7 54.1	88.3	8 04.1	87.3	30
20	9 50.8	91.8	10 01.3	90.8	10 11.5	89.8	10 21.7	88.8	10 31.7	87.8	20
10	12 18.4	92.2	12 29.0	91.2	12 39.3	90.2	12 49.4	89.2	12 59.4	88.2	10
5 00	14 46.0	92.7	14 56.6	91.6	15 07.0	90.6	15 17.1	89.6	15 26.9	88.6	5 00
4 50	17 13.5	93.1	17 24.2	92.1	17 34.6	91.1	17 44.8	90.0	17 54.6	89.0	4 50
40	19 41.0	93.6	19 51.9	92.6	20 02.4	91.5	20 12.6	90.5	20 22.3	89.4	40
30	22 08.3	94.1	22 19.4	93.1	22 30.1	92.0	22 40.2	90.9	22 50.0	89.9	30
20	24 35.7	94.6	24 46.9	93.6	24 57.6	92.5	25 08.0	91.4	25 17.8	90.3	20
10	27 02.8	95.1	27 14.2	94.1	27 25.1	93.0	27 35.6	91.8	27 45.5	90.7	10
4 00	29 29.9	95.7	29 41.5	94.6	29 52.7	93.5	30 03.2	92.3	30 13.2	91.2	4 00
3 50	31 56.8	96.3	32 08.8	95.2	32 20.1	94.0	32 30.8	92.8	32 40.8	91.7	3 50
40	34 23.5	96.9	34 35.8	95.7	34 47.4	94.6	34 58.3	93.4	35 08.5	92.2	40
30	36 50.1	97.6	37 02.6	96.3	37 14.6	95.1	37 25.8	93.9	37 36.1	92.7	30
20	39 16.4	98.3	39 29.5	97.0	39 41.7	95.8	39 53.1	94.5	40 03.6	93.2	20
10	41 42.4	99.1	41 55.9	97.7	42 08.6	96.4	42 20.2	95.1	42 31.1	93.8	10
3 00	44 08.2	99.9	44 22.2	98.5	44 35.2	97.1	44 47.4	95.7	44 58.5	94.4	3 00
2 50	46 33.5	100.8	46 48.2	99.3	47 01.6	97.9	47 14.2	96.4	47 25.6	95.0	2 50
40	48 58.4	101.7	49 13.7	100.2	49 27.9	98.7	49 40.9	97.2	49 52.8	95.7	40
30	51 22.8	102.7	51 38.8	101.2	51 53.7	99.6	52 07.3	98.1	52 20.0	96.5	30
20	53 46.5	103.9	54 03.5	102.3	54 19.1	100.7	54 33.5	99.0	54 46.3	97.3	20
10	56 09.5	105.2	56 27.4	103.5	56 44.0	101.8	56 59.0	100.0	57 12.8	98.2	10
2 00	58 31.5	106.7	58 50.8	104.9	59 08.2	103.1	59 24.4	101.2	59 38.8	99.3	2 00
1 50	60 52.4	108.4	61 13.0	106.5	61 31.8	104.5	61 48.9	102.5	62 04.2	100.4	1 50
40	63 11.6	110.4	63 33.8	108.3	63 54.2	106.2	64 12.6	104.0	64 29.2	101.8	40
30	65 29.0	112.7	65 53.0	110.5	66 15.2	108.3	66 35.2	105.9	66 53.1	103.5	30
20	67 43.9	115.5	68 10.3	113.1	68 34.6	110.6	68 56.7	108.1	69 16.4	105.4	20
10	69 55.2	118.8	70 24.6	116.2	70 51.5	113.6	71 16.0	110.8	71 37.8	107.8	10
1 00	72 02.1	122.9	72 34.8	120.2	73 05.0	117.3	73 32.6	114.2	73 57.4	110.9	1 00
0 50	74 02.5	128.1	74 39.5	125.1	75 13.5	122.0	75 45.0	118.6	76 13.1	114.9	0 50
40	75 53.6	134.6	76 35.3	131.5	77 14.5	128.2	77 51.0	124.5	78 24.4	120.5	40
30	77 31.4	142.8	78 18.5	139.9	79 04.0	136.5	79 47.0	132.7	80 26.5	128.4	30
20	78 49.9	153.3	79 43.1	150.8	80 34.8	147.8	81 25.0	144.3	82 12.8	140.1	20
10	79 41.7	165.9	80 39.8	164.4	81 37.4	162.6	82 34.4	160.3	83 30.5	157.4	10
0 00	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 52.0	85.1	1 02.4	84.1	1 12.7	83.1	1 23.1	82.1	1 33.4	81.1	6 00
5 50	3 19.4	85.5	3 29.6	84.5	3 39.5	83.5	3 49.5	82.5	3 59.5	81.5	5 50
40	5 46.6	85.9	5 56.4	84.9	6 06.2	83.9	6 16.0	83.0	6 25.6	82.0	40
30	8 14.0	86.3	8 23.7	85.3	8 33.2	84.3	8 42.8	83.3	8 51.9	82.3	30
20	10 41.3	86.7	10 50.9	85.7	11 00.3	84.7	11 09.5	83.7	11 18.4	82.7	20
10	13 09.0	87.1	13 18.3	86.1	13 27.4	85.1	13 36.4	84.1	13 45.0	83.1	10
5 00	15 36.5	87.6	15 45.7	86.5	15 54.6	85.5	16 03.4	84.5	16 11.7	83.5	5 00
4 50	18 04.1	88.0	18 13.2	86.9	18 22.0	85.9	18 30.5	84.9	18 38.6	83.8	4 50
40	20 31.7	88.4	20 40.7	87.3	20 49.3	86.3	20 57.6	85.2	21 05.4	84.1	40
30	22 59.4	88.8	23 08.3	87.7	23 16.9	86.6	23 24.9	85.6	23 32.4	84.5	30
20	25 27.1	89.2	25 35.9	88.1	25 44.2	87.0	25 52.2	85.9	25 59.5	84.8	20
10	27 54.8	89.6	28 03.6	88.5	28 11.8	87.4	28 19.5	86.2	28 26.6	85.1	10
4 00	30 22.5	90.0	30 31.2	88.9	30 39.4	87.8	30 47.0	86.6	30 53.9	85.4	4 00
3 50	32 50.2	90.4	32 59.0	89.3	33 07.0	88.1	33 14.5	86.9	33 21.1	85.8	3 50
40	35 18.0	90.9	35 26.7	89.7	35 34.6	88.5	35 42.0	87.3	35 48.5	86.1	40
30	37 45.8	91.4	37 54.5	90.2	38 02.4	88.9	38 09.6	87.6	38 15.9	86.4	30
20	40 13.3	91.9	40 22.1	90.6	40 30.0	89.3	40 37.2	88.0	40 43.3	86.7	20
10	42 41.0	92.4	42 49.9	91.1	42 57.7	89.7	43 04.9	88.4	43 10.8	87.0	10
3 00	45 08.5	93.0	45 17.4	91.6	45 25.5	90.1	45 32.5	88.7	45 38.4	87.3	3 00
2 50	47 36.0	93.5	47 45.1	92.1	47 53.2	90.6	48 00.3	89.1	48 05.9	87.6	2 50
40	50 03.3	94.2	50 12.7	92.6	50 20.9	91.1	50 27.9	89.5	50 33.7	88.0	40
30	52 30.8	94.9	52 40.2	93.2	52 48.6	91.6	52 55.7	89.9	53 01.1	88.3	30
20	54 57.7	95.6	55 07.7	93.9	55 16.2	92.2	55 23.4	90.4	55 28.9	88.6	20
10	57 24.5	96.4	57 35.0	94.6	57 43.7	92.7	57 51.1	90.9	57 56.4	89.0	10
2 00	59 51.3	97.3	60 02.1	95.4	60 11.3	93.4	60 18.8	91.4	60 24.2	89.4	2 00
1 50	62 17.8	98.4	62 29.2	96.3	62 38.7	94.1	62 46.5	91.9	62 52.0	89.8	1 50
40	64 43.5	99.6	64 55.8	97.3	65 06.0	94.9	65 14.1	92.6	65 19.8	90.2	40
30	67 09.0	101.1	67 22.2	98.5	67 33.0	95.9	67 41.6	93.3	67 47.3	90.7	30
20	69 33.5	102.7	69 48.0	99.9	69 59.9	97.0	70 09.0	94.1	70 15.2	91.1	20
10	71 57.0	104.8	71 13.2	101.7	72 26.2	98.4	72 36.2	95.2	72 42.8	91.8	10
1 00	74 18.9	107.5	74 37.1	103.9	74 51.9	100.2	75 03.2	96.5	75 10.5	92.5	1 00
0 50	76 38.5	111.1	77 00.0	107.0	77 16.2	102.6	77 29.8	98.2	77 38.0	93.6	0 50
40	78 54.0	116.0	79 19.3	111.2	79 40.0	106.1	79 55.4	100.6	80 05.2	94.9	40
30	81 03.0	123.4	81 34.0	117.8	82 00.0	111.5	82 20.0	104.5	82 32.0	97.1	30
20	82 57.5	134.9	83 38.0	128.6	84 13.0	120.8	84 40.3	111.6	84 58.1	101.1	20
10	84 25.2	153.4	85 17.8	148.1	86 06.8	140.3	86 48.4	128.8	87 20.4	111.9	10
0 00	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 01.3	75.8	6 10
6 00	1 43.7	80.1	1 53.9	79.2	2 04.1	78.2	2 14.3	77.2	2 24.5	76.2	6 00
5 50	4 09.3	80.6	4 19.1	79.6	4 28.9	78.6	4 38.5	77.6	4 48.1	76.6	5 50
40	6 35.1	81.0	6 44.4	80.0	6 53.7	79.0	7 02.8	78.0	7 11.8	77.0	40
30	9 01.1	81.3	9 10.0	80.3	9 18.8	79.3	9 27.4	78.3	9 35.9	77.3	30
20	11 27.2	81.7	11 35.7	80.7	11 44.0	79.7	11 52.2	78.7	12 00.1	77.7	20
10	13 53.4	82.1	14 01.6	81.1	14 09.6	80.0	14 17.1	79.0	14 24.5	78.0	10
5 00	16 19.8	82.4	16 27.5	81.4	16 35.0	80.3	16 42.2	79.3	16 49.0	78.3	5 00
4 50	18 46.3	82.8	18 53.7	81.7	19 00.8	80.6	19 07.4	79.6	19 13.7	78.5	4 50
40	21 12.9	83.1	21 19.9	82.0	21 26.5	80.9	21 32.7	79.9	21 38.5	78.8	40
30	23 39.5	83.4	23 46.2	82.3	23 52.5	81.2	23 58.2	80.1	24 03.6	79.0	30
20	26 06.3	83.7	26 12.7	82.6	26 18.5	81.5	26 23.8	80.4	26 28.6	79.3	20
10	28 33.3	84.0	28 39.2	82.9	28 44.7	81.7	28 49.5	80.6	28 53.8	79.5	10
4 00	31 00.2	84.3	31 05.8	83.1	31 10.8	82.0	31 15.3	80.8	31 19.0	79.6	4 00
3 50	33 27.2	84.6	33 32.4	83.4	33 37.3	82.2	33 41.2	81.0	33 44.4	79.8	3 50
40	35 54.2	84.8	35 59.3	83.6	36 03.5	82.4	36 07.0	81.1	36 09.8	79.9	40
30	38 21.4	85.1	38 26.0	83.8	38 30.1	82.6	38 33.0	81.3	38 35.4	80.0	30
20	40 48.7	85.4	40 53.0	84.1	40 56.5	82.7	40 59.0	81.4	41 00.7	80.1	20
10	43 15.9	85.6	43 20.0	84.3	43 23.1	82.9	43 25.1	81.5	43 26.9	80.1	10
3 00	45 43.3	85.9	45 47.0	84.5	45 49.6	83.0	45 51.3	81.6	45 51.8	80.2	3 00
2 50	48 11.6	86.1	48 14.0	84.7	48 16.3	83.1	48 17.4	81.6	48 17.4	80.1	2 50
40	50 38.0	86.4	50 41.1	84.8	50 42.9	83.2	50 43.6	81.7	50 42.9	80.1	40
30	53 05.3	86.6	53 08.3	85.0	53 09.8	83.3	53 09.6	81.6	53 08.5	79.9	30
20	55 32.9	86.9	55 35.4	85.1	55 36.3	83.3	55 35.8	81.6	55 33.8	79.8	20
10	58 00.5	87.1	58 02.5	85.2	58 03.1	83.3	58 01.9	81.5	57 59.1	79.6	10
2 00	60 28.1	87.3	60 29.9	85.3	60 29.8	83.3	60 27.9	81.3	60 24.3	79.3	2 00
1 50	62 55.5	87.5	62 57.2	85.4	62 56.7	83.2	62 53.9	81.0	62 49.3	78.8	1 50
40	65 23.3	87.8	65 24.3	85.4	65 23.1	83.0	65 19.7	80.6	65 14.0	78.2	40
30	67 50.8	88.0	67 51.6	85.4	67 49.8	82.7	67 45.4	80.1	67 38.5	77.5	30
20	70 18.4	88.3	70 18.8	85.2	70 16.2	82.3	70 10.8	79.4	70 02.5	76.5	20
10	72 46.1	88.5	72 46.0	85.1	72 42.5	81.7	72 35.5	78.4	72 25.7	75.1	10
1 00	75 13.8	88.7	75 13.3	84.8	75 08.5	80.9	75 00.1	77.0	74 47.8	73.3	1 00
0 50	77 41.5	88.9	77 40.0	84.2	77 34.4	79.6	77 23.5	75.0	77 08.5	70.7	0 50
40	80 09.1	89.1	80 07.0	83.3	79 59.0	77.6	79 45.2	72.1	79 25.8	66.8	40
30	82 36.8	89.3	82 33.0	81.6	82 22.5	74.1	82 03.5	67.1	81 38.5	60.7	30
20	85 04.6	89.6	84 58.9	78.1	84 42.0	67.4	84 15.3	58.0	83 40.9	50.2	20
10	87 32.4	89.8	87 20.8	67.6	86 50.0	50.6	86 07.6	39.0	85 18.7	31.2	10
0 00	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 11.9	74.8	0 22.7	73.8	0 33.3	72.9	0 44.0	71.9	0 54.7	70.9	6 10
6 00	2 34.5	75.2	2 44.6	74.2	2 54.6	73.3	3 04.5	72.3	3 14.5	71.3	6 00
5 50	4 57.6	75.6	5 06.9	74.6	5 16.2	73.6	5 25.3	72.6	5 34.5	71.6	5 50
40	7 20.6	76.0	7 29.5	75.0	7 38.1	74.0	7 46.5	73.0	7 54.9	72.0	40
30	9 44.1	76.3	9 52.3	75.3	10 00.1	74.3	10 07.8	73.3	10 15.4	72.3	30
20	12 07.7	76.7	12 15.3	75.6	12 22.5	74.6	12 29.5	73.6	12 36.3	72.6	20
10	14 31.7	77.0	14 38.4	75.9	14 45.0	74.9	14 51.4	73.9	14 57.3	72.8	10
5 00	16 55.6	77.2	17 01.8	76.2	17 07.7	75.2	17 13.2	74.1	17 18.6	73.1	5 00
4 50	19 19.7	77.5	19 25.4	76.4	19 30.6	75.4	19 35.4	74.3	19 39.9	73.3	4 50
40	21 43.9	77.7	21 49.0	76.7	21 53.6	75.6	21 57.7	74.5	22 01.5	73.4	40
30	24 08.5	77.9	24 12.8	76.9	24 16.7	75.8	24 20.1	74.7	24 23.1	73.6	30
20	26 32.9	78.1	26 36.7	77.0	26 39.9	75.9	26 42.6	74.8	26 44.9	73.7	20
10	28 57.5	78.3	29 00.7	77.2	29 03.2	76.0	29 05.2	74.9	29 06.6	73.7	10
4 00	31 22.2	78.4	31 24.7	77.3	31 26.6	76.1	31 27.8	74.9	31 28.5	73.8	4 00
3 50	33 47.0	78.6	33 48.8	77.4	33 49.9	76.2	33 50.4	74.9	33 50.2	73.8	3 50
40	36 11.8	78.7	36 13.0	77.4	36 13.5	76.2	36 13.1	74.9	36 12.1	73.7	40
30	38 36.7	78.8	38 37.4	77.4	38 36.9	76.2	38 35.7	74.9	38 33.8	73.6	30
20	41 01.5	78.8	41 01.4	77.4	41 00.4	76.1	40 58.4	74.8	40 55.6	73.5	20
10	43 26.4	78.8	43 25.6	77.4	43 23.7	76.0	43 20.8	74.6	43 17.0	73.3	10
3 00	45 51.3	78.7	45 49.7	77.3	45 47.0	75.9	45 43.2	74.4	45 38.5	73.0	3 00
2 50	48 16.1	78.6	48 13.7	77.1	48 10.1	75.6	48 05.4	74.1	47 59.5	72.6	2 50
40	50 40.9	78.5	50 37.6	76.9	50 33.2	75.3	50 27.4	73.8	50 20.4	72.2	40
30	53 05.8	78.3	53 01.5	76.6	52 55.8	75.0	52 49.0	73.3	52 40.7	71.7	30
20	55 30.1	78.0	55 25.0	76.3	55 18.6	74.5	55 10.4	72.8	55 00.9	71.1	20
10	57 54.6	77.7	57 48.4	75.8	57 40.6	73.9	57 31.3	72.1	57 20.2	70.3	10
2 00	60 18.8	77.2	60 11.5	75.2	60 02.4	73.2	59 51.5	71.3	59 39.0	69.3	2 00
50	62 42.7	76.6	62 34.1	74.5	62 23.4	72.3	62 11.0	70.2	61 56.6	68.2	1 50
40	65 06.1	75.9	64 56.0	73.5	64 43.8	71.2	64 29.4	69.0	64 13.2	66.7	40
30	67 30.9	74.9	67 17.3	72.3	67 03.1	69.8	66 46.5	67.3	66 27.7	65.0	30
20	69 51.3	73.6	69 37.4	70.8	69 21.0	68.0	69 01.9	65.4	68 40.6	62.8	20
10	72 12.3	71.9	71 56.0	68.8	71 37.0	65.8	71 14.7	62.8	70 50.2	60.0	10
1 00	74 32.0	69.6	74 12.7	66.1	73 50.0	62.7	73 24.3	59.4	72 56.2	56.5	1 00
0 50	76 48.6	66.4	76 25.6	62.5	75 59.0	58.7	75 28.6	55.2	74 55.7	52.0	0 50
40	79 02.1	62.0	78 33.7	57.3	78 01.5	53.2	77 25.8	49.4	76 47.7	46.0	40
30	81 08.4	55.0	80 33.0	49.8	79 53.5	45.4	79 11.0	41.5	78 26.0	38.1	30
20	83 00.7	43.8	82 16.3	38.5	81 28.6	34.2	80 38.6	30.7	79 47.0	27.7	20
10	84 26.2	25.8	83 31.5	21.8	82 35.4	18.9	81 38.4	16.6	80 40.9	14.7	10
0 00	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	1 05.3	69.9	1 16.1	68.9	1 26.6	67.9	1 37.3	66.9	1 47.9	65.9	6 10
6 00	3 24.3	70.3	3 34.1	69.3	3 43.8	68.3	3 53.4	67.3	4 03.0	66.3	6 00
5 50	5 43.4	70.7	5 52.4	69.7	6 01.1	68.7	6 09.8	67.7	6 18.5	66.7	5 50
40	8 03.0	71.0	8 11.1	70.0	8 18.9	69.0	8 26.7	68.0	8 34.3	67.0	40
30	10 22.7	71.3	10 30.0	70.3	10 36.9	69.3	10 43.7	68.3	10 50.3	67.3	30
20	12 42.9	71.6	12 49.2	70.6	12 55.2	69.5	13 01.1	68.5	13 06.7	67.5	20
10	15 03.1	71.8	15 08.5	70.8	15 13.7	69.7	15 18.6	68.7	15 23.3	67.7	10
5 00	17 23.5	72.0	17 28.2	71.0	17 32.4	69.9	17 36.4	68.9	17 40.0	67.8	5 00
4 50	19 44.1	72.2	19 47.8	71.1	19 51.2	70.0	19 54.2	69.0	19 56.8	67.9	4 50
40	22 04.8	72.3	22 07.7	71.3	22 10.2	70.2	22 12.2	69.1	22 13.9	68.0	40
30	24 25.6	72.4	24 27.6	71.4	24 29.1	70.3	24 30.2	69.2	24 30.8	68.1	30
20	26 46.5	72.5	26 47.7	71.4	26 48.2	70.3	26 48.4	69.2	26 47.9	68.1	20
10	29 07.3	72.6	29 07.7	71.4	29 07.2	70.3	29 06.3	69.1	29 04.8	68.0	10
4 00	31 28.4	72.6	31 27.7	71.4	31 26.4	70.2	31 24.4	69.1	31 21.8	67.9	4 00
3 50	33 49.2	72.5	33 47.6	71.3	33 45.2	70.1	33 42.2	68.9	33 38.6	67.7	3 50
40	36 10.2	72.5	36 07.6	71.2	36 04.2	70.0	36 00.1	68.7	35 55.3	67.5	40
30	38 30.9	72.3	38 27.4	71.0	38 22.9	69.8	38 17.6	68.5	38 11.5	67.2	30
20	40 51.7	72.1	40 47.0	70.8	40 41.4	69.5	40 35.0	68.2	40 27.7	66.9	20
10	43 12.2	71.9	43 06.4	70.5	42 59.6	69.1	42 51.9	67.8	42 43.3	66.4	10
3 00	45 32.5	71.6	45 25.5	70.2	45 17.6	68.7	45 08.5	67.3	44 58.5	65.9	3 00
2 50	47 52.5	71.2	47 44.2	69.7	47 34.9	68.2	47 24.5	66.8	47 13.1	65.3	2 50
40	50 12.1	70.7	50 02.5	69.1	49 51.9	67.6	49 39.9	66.1	49 27.0	64.6	40
30	52 31.1	70.1	52 20.4	68.5	52 08.9	66.9	51 54.6	65.3	51 39.8	63.7	30
20	54 49.8	69.4	54 37.3	67.7	54 23.6	66.0	54 08.3	64.3	53 51.7	62.6	20
10	57 07.5	68.5	56 53.5	66.7	56 37.9	64.9	56 20.6	63.2	56 02.2	61.4	10
2 00	59 24.5	67.4	59 08.6	65.5	58 51.0	63.7	58 31.9	61.8	58 11.3	60.0	2 00
1 50	61 40.2	66.1	61 22.2	64.1	61 02.3	62.2	60 41.1	60.3	60 18.0	58.4	1 50
40	63 54.6	64.6	63 34.2	62.4	63 12.1	60.4	62 48.2	58.3	62 22.6	56.4	40
30	66 06.9	62.6	65 44.0	60.4	65 19.1	58.2	64 52.2	56.1	64 23.9	54.0	30
20	68 16.8	60.3	67 50.8	57.9	67 22.9	55.5	66 52.9	53.3	66 21.3	51.2	20
10	70 23.2	57.3	69 53.7	54.8	69 22.2	52.3	68 49.0	50.0	68 13.6	47.8	10
1 00	72 25.0	53.6	71 51.6	50.9	71 16.2	48.3	70 38.7	46.0	69 59.5	43.7	1 00
0 50	74 20.2	48.9	73 42.2	46.1	73 02.2	43.5	72 20.2	41.1	71 37.1	38.9	0 50
40	76 06.3	42.8	75 23.5	40.0	74 38.6	37.4	73 51.9	35.1	73 04.1	33.0	40
30	77 39.2	35.0	76 50.7	32.4	76 00.2	30.1	75 09.0	28.0	74 16.7	26.2	30
20	78 54.0	25.2	77 59.7	23.0	77 04.8	21.2	76 08.9	19.6	75 12.6	18.2	20
10	79 42.8	13.3	78 44.4	12.0	77 45.8	11.0	76 46.9	10.1	75 47.9	9.3	10
0 00	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	76 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 27.7	90.4	2 17.2	91.4	2 06.8	92.4	1 56.4	93.4	1 45.7	94.4	5 50
40	4 55.5	90.9	4 44.9	91.9	4 34.3	92.9	4 23.7	93.8	4 13.0	94.8	40
30	7 23.1	91.3	7 12.6	92.3	7 01.8	93.3	6 51.0	94.3	6 40.1	95.3	30
20	9 50.8	91.8	9 40.1	92.8	9 29.2	93.8	9 18.3	94.8	9 07.2	95.8	20
10	12 18.4	92.2	12 07.7	93.2	11 56.7	94.2	11 45.5	95.2	11 34.2	96.2	10
5 00	14 46.0	92.7	14 35.1	93.7	14 23.9	94.7	14 12.4	95.7	14 00.8	96.7	5 00
4 50	17 13.5	93.1	17 02.5	94.2	16 51.1	95.2	16 39.4	96.2	16 27.4	97.2	4 50
40	19 41.0	93.6	19 29.8	94.7	19 18.1	95.7	19 06.2	96.7	18 53.9	97.8	40
30	22 08.3	94.1	21 56.8	95.2	21 45.1	96.2	21 32.8	97.2	21 20.2	98.3	30
20	24 35.7	94.6	24 24.0	95.7	24 11.8	96.8	23 59.3	97.8	23 46.3	98.9	20
10	27 02.8	95.1	26 50.8	96.3	26 38.4	97.4	26 25.5	98.4	26 12.1	99.5	10
4 00	29 29.9	95.7	29 17.6	96.9	29 04.8	98.0	28 51.4	99.1	28 37.6	100.2	4 00
3 50	31 56.8	96.3	31 44.3	97.5	31 31.0	98.6	31 17.2	99.8	31 02.8	100.9	3 50
40	34 23.5	96.9	34 10.6	98.1	33 56.9	99.3	33 42.6	100.5	33 27.7	101.6	40
30	36 50.1	97.6	36 36.7	98.8	36 22.6	100.0	36 07.8	101.2	35 52.2	102.4	30
20	39 16.4	98.3	39 02.6	99.5	38 47.9	100.8	38 32.4	102.0	38 16.3	103.3	20
10	41 42.4	99.1	41 28.0	100.3	41 12.8	101.6	40 56.6	102.9	40 39.8	104.2	10
3 00	44 08.2	99.9	43 53.2	101.2	43 37.2	102.5	43 20.4	103.9	43 02.7	105.2	3 00
2 50	46 33.5	100.8	46 17.9	102.1	46 01.1	103.5	45 43.4	104.9	45 24.8	106.3	2 50
40	48 58.4	101.7	48 41.9	103.2	48 24.4	104.6	48 05.8	106.0	47 46.3	107.4	40
30	51 22.8	102.7	51 05.4	104.3	50 47.0	105.8	50 27.3	107.3	50 06.7	108.8	30
20	53 46.5	103.9	53 28.3	105.5	53 08.7	107.1	52 47.9	108.7	52 26.0	110.2	20
10	56 09.5	105.2	55 50.0	106.9	55 29.2	108.6	55 07.1	110.2	54 43.9	111.8	10
2 00	58 31.5	106.7	58 10.9	108.5	57 48.6	110.3	57 25.1	112.0	57 00.2	113.7	2 00
1 50	60 52.4	108.4	60 30.1	110.3	60 06.2	112.2	59 41.0	114.0	59 14.2	115.8	1 50
40	63 11.6	110.4	62 47.7	112.4	62 22.0	114.4	61 54.7	116.3	61 26.1	118.2	40
30	65 29.0	112.7	65 02.9	114.9	64 35.0	117.0	64 05.4	119.0	63 34.6	120.9	30
20	67 43.9	115.5	67 15.3	117.8	66 45.0	120.0	66 12.9	122.1	65 39.1	124.1	20
10	69 55.2	118.8	69 24.0	121.3	68 50.6	123.6	68 15.2	125.9	67 38.5	128.0	10
1 00	72 02.1	122.9	71 27.4	125.5	70 50.4	128.0	70 11.9	130.3	69 31.5	132.4	1 00
0 50	74 02.5	128.1	73 23.8	130.8	72 42.5	133.3	72 00.0	135.6	71 15.8	137.7	0 50
40	75 53.6	134.6	75 09.9	137.3	74 24.3	139.8	73 37.6	142.0	72 49.3	144.0	40
30	77 31.4	142.8	76 42.2	145.4	75 51.8	147.7	75 00.5	149.8	74 08.0	151.5	30
20	78 49.9	153.3	77 55.6	155.4	77 00.5	157.2	76 04.8	158.8	75 08.6	160.1	20
10	79 41.7	165.9	78 43.3	167.1	77 44.7	168.1	76 45.8	169.0	75 46.8	169.8	10
0 00	80 0.0	180.0	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 35.2	95.4	1 24.5	96.4	1 13.8	97.3	1 03.2	98.3	0 52.5	99.3	5 50
40	4 02.1	95.8	3 51.2	96.8	3 40.2	97.8	3 29.2	98.8	3 18.2	99.8	40
30	6 29.0	96.3	6 17.9	97.3	6 06.5	98.2	5 55.2	99.2	5 43.7	100.2	30
20	8 55.8	96.7	8 44.3	97.7	8 32.6	98.7	8 20.9	99.7	8 08.9	100.7	20
10	11 22.5	97.2	11 10.6	98.2	10 58.6	99.2	10 46.4	100.2	10 33.9	101.2	10
5 00	13 48.9	97.7	13 36.7	98.7	13 24.2	99.7	13 11.6	100.8	12 58.7	101.8	5 00
4 50	16 15.2	98.2	16 02.7	99.3	15 49.8	100.3	15 36.6	101.3	15 23.3	102.3	4 50
40	18 41.2	98.8	18 28.2	99.8	18 14.8	100.9	18 01.3	101.9	17 47.3	102.9	40
30	21 07.1	99.4	20 53.7	100.4	20 39.9	101.5	20 25.7	102.5	20 11.2	103.5	30
20	23 32.8	100.0	23 18.8	101.0	23 04.4	102.1	22 49.8	103.2	22 34.5	104.2	20
10	25 58.1	100.6	25 43.7	101.7	25 28.8	102.8	25 13.4	103.9	24 57.6	104.9	10
4 00	28 23.1	101.3	28 08.1	102.4	27 52.6	103.5	27 36.6	104.6	27 20.1	105.7	4 00
3 50	30 47.8	102.0	30 32.2	103.1	30 16.0	104.3	29 59.4	105.4	29 42.0	106.5	3 50
40	33 12.1	102.8	32 55.8	103.9	32 38.9	105.1	32 21.4	106.2	32 03.4	107.3	40
30	35 35.9	103.6	35 18.9	104.8	35 01.3	106.0	34 43.0	107.1	34 24.1	108.3	30
20	37 59.2	104.5	37 41.4	105.7	37 22.9	106.9	37 03.8	108.1	36 43.9	109.3	20
10	40 21.9	105.5	40 03.4	106.7	39 43.9	107.9	39 23.8	109.1	39 02.9	110.3	10
3 00	42 44.0	106.5	42 24.4	107.8	42 04.0	109.0	41 42.9	110.3	41 20.9	111.5	3 00
2 50	45 05.1	107.6	44 44.6	108.9	44 23.2	110.2	44 01.0	111.5	43 37.7	112.8	2 50
40	47 25.6	108.8	47 03.9	110.2	46 41.2	111.6	46 17.7	112.9	45 53.2	114.2	40
30	49 44.8	110.2	49 21.8	111.6	48 57.9	113.0	48 43.4	114.4	48 07.1	115.8	30
20	52 02.8	111.7	51 38.4	113.2	51 12.9	114.7	50 46.7	116.1	50 19.2	117.5	20
10	54 19.0	113.4	53 53.4	114.9	53 26.3	116.5	52 58.3	117.9	52 29.0	119.4	10
2 00	56 33.8	115.3	56 06.1	116.9	55 37.3	118.5	55 07.6	120.0	54 36.4	121.5	2 00
1 50	58 46.1	117.5	58 16.6	119.2	57 45.8	120.8	57 14.0	122.4	56 40.9	123.9	1 50
40	60 55.7	120.0	60 24.0	121.7	59 51.0	123.4	59 17.0	125.0	58 41.6	126.6	40
30	63 01.8	122.8	62 27.9	124.6	61 52.4	126.3	61 15.7	128.0	60 37.9	129.6	30
20	65 03.8	126.1	64 26.8	128.0	63 48.7	129.7	63 09.4	131.4	62 29.0	133.0	20
10	67 00.0	129.9	66 20.4	131.8	65 39.2	133.6	64 56.8	135.3	64 13.4	136.9	10
1 00	68 49.7	134.5	68 06.4	136.3	67 22.1	138.1	66 36.7	139.8	65 50.2	141.4	1 00
0 50	70 30.2	139.8	69 43.8	141.6	68 55.6	143.3	68 07.0	144.9	67 17.5	146.4	0 50
40	71 59.7	146.0	71 09.0	147.7	70 17.7	149.3	69 25.8	150.7	68 33.0	152.0	40
30	73 14.6	153.2	72 20.5	154.7	71 25.9	156.0	70 30.9	157.3	69 35.2	158.3	30
20	74 11.6	161.4	73 14.5	162.5	72 17.1	163.5	71 19.6	164.4	70 21.6	165.2	20
10	74 47.7	170.5	73 48.4	171.1	72 49.2	171.6	71 49.7	172.0	70 50.3	172.4	10
0 00	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 41.8	100.3	0 31.1	101.3	0 20.4	102.3	0 09.6	103.3			5 50
40	3 07.0	100.7	2 55.8	101.7	2 44.5	102.7	2 33.2	103.7	2 21.9	104.7	40
30	5 32.1	101.2	5 20.3	102.2	5 08.5	103.2	4 56.7	104.2	4 44.7	105.1	30
20	7 56.8	101.7	7 44.6	102.7	7 32.2	103.7	7 19.7	104.7	7 07.1	105.6	20
10	10 21.4	102.2	10 08.6	103.2	9 55.6	104.2	9 42.4	105.2	9 29.2	106.2	10
5 00	12 45.5	102.8	12 32.2	103.8	12 18.6	104.7	12 04.8	105.7	11 50.8	106.7	5 00
4 50	15 09.6	103.3	14 55.5	104.3	14 41.4	105.3	14 26.8	106.3	14 12.1	107.3	4 50
40	17 33.1	103.9	17 18.4	105.0	17 03.5	106.0	16 48.3	107.0	16 32.8	108.0	40
30	19 56.2	104.5	19 40.9	105.6	19 25.4	106.6	19 09.4	107.6	18 53.1	108.7	30
20	22 19.0	105.2	22 03.0	106.3	21 46.6	107.3	21 29.8	108.3	21 12.7	109.4	20
10	24 41.3	105 9	24 24.6	107.0	24 07.4	108.1	23 49.7	109.1	23 31.7	110.2	10
4 00	27 03.0	106.7	26 45.5	107.8	26 27.4	108.9	26 09.0	109.9	25 50.0	111.0	4 00
3 50	29 24.2	107.5	29 05.7	108.6	28 46.9	109.7	28 27.5	110.8	28 07.5	111.9	3 50
40	31 44.6	108.4	31 25.4	109.5	31 05.5	110.7	30 45.1	111.8	30 24.1	112.9	40
30	34 04.4	109.4	33 44.1	110.5	33 23.3	111.7	33 01.8	112.8	32 39.8	113.9	30
20	36 23.3	110.4	36 01.9	111.5	35 40.0	112.7	35 17.4	113.9	34 54.3	115.0	20
10	38 41.3	111.5	38 18.9	112.7	37 55.7	113.9	37 32.0	115.1	37 07.5	116.2	10
3 00	40 58.1	112.7	40 34.4	114.0	40 10.1	115.2	39 45.0	116.4	39 19.3	117.5	3 00
2 50	43 13.7	114.0	42 48.6	115.3	42 23.1	116.5	41 56.6	117.8	41 29.4	119.0	2 50
40	45 27.7	115.5	45 01.5	116.8	44 34.3	118.1	44 06.4	119.3	43 37.8	120.5	40
30	47 40.2	117.1	47 12.5	118.4	46 43.7	119.7	46 14.2	121.0	45 44.0	122.2	30
20	49 50.7	118.8	49 21.2	120.2	48 50.8	121.5	48 19.6	122.8	47 47.7	124.1	20
10	51 58.8	120.7	51 27.7	122.2	51 55.5	123.5	50 22.4	124.8	49 48.6	126.1	10
2 00	54 04.4	122.9	53 31.1	124.4	52 57.1	125.7	52 22.0	127.1	51 46.2	128.4	2 00
1 50	56 06.6	125.3	55 31.4	126.8	54 55.2	128.2	54 18.0	129.6	53 39.9	130.9	1 50
40	58 05.1	128.1	57 27.5	129.6	56 49.0	130.9	56 09.6	132.3	55 29.3	133.6	40
30	59 59.0	131.1	59 19.0	132.6	58 38.0	134.0	57 56.3	135.4	57 13.5	136.7	30
20	61 47.2	134.6	61 04.7	136.1	60 21.1	137.5	59 36.8	138.8	58 51.8	140.1	20
10	63 29.0	138.4	62 43.6	139.9	61 57.3	141.3	61 10.4	142.6	60 22.7	143.8	10
1 00	65 02.8	142.8	64 14.5	144.2	63 25.5	145.5	62 35.8	146.8	61 45.7	147.9	1 00
0 50	66 27.0	147.8	65 35.8	149.1	64 44.0	150.3	63 51.9	151.4	62 59.2	152.5	0 50
40	67 39.7	153.3	66 45.9	154.4	65 51.5	155.5	64 56.8	156.5	64 01.8	157.4	40
30	68 39.2	159.3	67 42.9	160.2	66 46.4	161.1	65 49.4	161.9	64 52.3	162.7	30
20	69 23.5	165.9	68 25.2	166.6	67 26.7	167.2	66 28.1	167.7	65 29.5	168.2	20
10	69 50.8	172.8	68 51.2	173.2	67 51.6	173.5	66 52.0	173.8	65 52.5	174.1	10
0 00	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

50° 55′5

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 10.5	105.6	1 59.1	106.6	1 47.7	107.6	1 36.1	108.6	1 24.7	109.6	5 40
30	4 32.6	106.1	4 20.5	107.1	4 08.2	108.1	3 55.8	109.1	3 43.6	110.1	30
20	6 54.3	106.7	6 41.5	107.6	6 28.5	108.6	6 15.3	109.6	6 02.2	110.6	20
10	9 15.7	107.2	9 02.1	108.1	8 48.3	109.1	8 34.4	110.1	8 20.1	111.1	10
5 00	11 36.6	107.7	11 22.2	108.7	11 07.6	109.7	10 52.8	110.7	10 37.8	111.7	5 00
4 50	13 57.1	108.3	13 41.8	109.3	13 26.4	110.3	13 10.6	111.3	12 54.7	112.3	4 50
40	16 17.0	109.0	16 01.0	110.0	15 44.6	111.0	15 28.0	112.0	15 11.1	113.0	40
30	18 36.5	109.7	18 19.6	110.7	18 02.2	111.7	17 44.6	112.7	17 26.7	113.7	30
20	20 55.2	110.4	20 37.4	111.4	20 19.1	112.5	20 00.5	113.5	19 41.6	114.5	20
10	23 13.3	111.2	22 54.5	112.2	22 35.2	113.3	22 15.6	114.3	21 55.6	115.3	10
4 00	25 30.6	112.0	25 10.8	113.1	24 50.5	114.2	24 29.8	115.2	24 08.7	116.2	4 00
3 50	27 47.1	112.9	27 26.3	114.0	27 04.8	115.1	26 42.9	116.1	26 20.7	117.2	3 50
40	30 02.6	113.9	29 40.6	115.0	29 18.1	116.1	28 55.0	117.1	28 31.6	118.2	40
30	32 17.1	115.0	31 54.1	116.1	31 30.2	117.2	31 05.8	118.2	30 41.1	119.3	30
20	34 30.4	116.1	34 06.0	117.2	33 41.0	118.3	33 15.4	119.4	32 49.3	120.5	20
10	36 42.3	117.4	36 16.7	118.5	35 50.3	119.6	35 23.3	120.7	34 55.7	121.8	10
3 00	38 52.8	118.7	38 25.6	119.8	37 57.8	120.9	37 29.4	122.1	37 00.4	123.2	3 00
2 50	41 01.5	120.1	40 32.9	121.3	40 03.5	122.4	39 33.5	123.6	39 02.9	124.7	2 50
40	43 08.2	121.7	42 38.0	122.9	42 07.1	124.0	41 35.5	125.2	41 03.3	126.3	40
30	45 12.7	123.4	44 41.0	124.6	44 08.3	125.8	43 34.9	127.0	43 00.9	128.1	30
20	47 14.7	125.3	46 41.0	126.5	46 06.7	127.7	45 31.5	128.9	44 55.8	130.0	20
10	49 13.7	127.4	48 38.3	128.6	48 01.8	129.8	47 24.8	131.0	46 47.2	132.1	10
2 00	51 09.4	129.7	50 31.8	130.9	49 53.6	132.1	49 14.4	133.3	48 34.9	134.4	2 00
1 50	53 01.6	132.2	52 21.5	133.4	51 40.9	134.6	50 59.9	135.8	50 18.1	136.9	1 50
40	54 48.2	134.9	54 06.3	136.1	53 23.7	137.3	52 40.4	138.5	51 56.6	139.6	40
30	56 30.1	137.9	55 45.9	139.2	55 01.0	140.3	54 15.4	141.5	53 29.3	142.6	30
20	58 05.8	141.3	57 19.1	142.5	56 32.0	143.6	55 44.2	144.7	54 55.9	145.8	20
10	59 34.3	145.0	58 45.5	146.1	57 55.9	147.2	57 05.7	148.3	56 15.3	149.3	10
1 00	60 54.8	149.0	60 03.5	150.1	59 11.8	151.1	58 19.4	152.1	57 26.9	153.0	1 00
0 50	62 05.7	153.5	61 12.4	154.4	60 18.4	155.3	59 24.0	156.2	58 29.3	157.0	0 50
40	63 06.4	158.2	62 10.7	159.1	61 14.9	159.8	60 18.5	160.5	59 22.3	161.2	40
30	63 55.0	163.3	62 57.6	164.0	62 00.0	164.6	61 02.1	165.1	60 04.2	165.7	30
20	64 30.8	168.7	63 32.0	169.2	62 33.1	169.6	61 34.1	170.0	60 35.1	170.3	20
10	64 52.7	174.3	63 52.9	174.5	62 53.2	174.7	61 53.5	174.9	60 53.7	175.1	10
0 00	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 13.1	110.6	1 01.6	111.6	0 49.9	112.5	0 38.4	113.5	0 26.8	114.5	5 40
30	3 31.2	111.0	3 18.7	112.0	3 06.2	113.0	2 53.5	114.0	2 40.8	114.9	30
20	5 48.9	111.5	5 35.4	112.5	5 21.9	113.5	5 08.3	114.5	4 54.6	115.4	20
10	8 06.0	112.1	7 51.6	113.1	7 37.2	114.0	7 22.5	115.0	7 07.8	116.0	10
5 00	10 22.6	112.7	10 07.3	113.7	9 51.8	114.6	9 36.0	115.6	9 20.2	116.6	5 00
4 50	12 38.6	113.3	12 22.2	114.3	12 05.6	115.3	11 48.8	116.3	11 31.9	117.3	4 50
40	14 54.0	114.0	14 36.6	115.0	14 18.9	116.0	14 01.0	116.9	13 42.9	117.9	40
30	17 08.5	114.7	16 50.1	115.7	16 31.2	116.7	16 12.2	117.7	15 52.9	118.7	30
20	19 22.3	115.5	19 02.8	116.5	18 42.8	117.5	18 22.6	118.5	18 02.1	119.5	20
10	21 35.2	116.3	21 14.5	117.3	20 53.3	118.3	20 31.9	119.3	20 10.1	120.3	10
4 00	23 47.2	117.2	23 25.2	118.2	23 02.9	119.2	22 40.2	120.2	22 17.1	121.2	4 00
3 50	15 57.9	118.2	25 34.7	119.2	25 11.1	120.2	24 47.1	121.2	24 22.7	122.3	3 50
40	28 07.6	119.2	27 43.1	120.3	27 18.1	121.3	26 52.7	122.3	26 27.0	123.3	40
30	30 15.7	120.3	29 49.9	121.4	29 23.6	122.4	28 56.8	123.4	28 29.5	124.5	30
20	32 22.5	121.5	31 55.3	122.6	31 27.5	123.7	30 59.3	124.7	30 30.5	125.7	20
10	34 27.5	122.8	33 58.7	123.9	33 29.5	125.0	32 59.8	126.0	32 29.5	127.1	10
3 00	36 30.6	124.2	36 00.4	125.3	35 29.6	126.4	34 58.3	127.4	34 26.4	128.5	3 00
2 50	38 31.7	125.7	37 59.7	126.8	37 27.3	127.9	36 54.4	129.0	36 20.8	130.1	2 50
40	40 30.4	127.4	39 56.7	128.5	39 22.7	129.6	38 47.9	130.6	38 12.7	131.7	40
30	42 26.2	129.2	41 51.0	130.3	41 15.1	131.3	40 38.7	132.4	40 01.6	133.5	30
20	44 19.2	131.1	43 42.0	132.2	43 04.4	133.3	42 26.0	134.3	41 47.1	135.4	20
10	46 08.4	133.2	45 29.7	134.3	44 50.0	135.4	44 09.7	136.4	43 29.0	137.5	10
2 00	47 54.3	135.5	47 13.3	136.6	46 31.7	137.6	45 49.6	138.6	45 06.9	139.7	2 00
1 50	49 35.6	138.0	48 52.5	139.1	48 08.8	140.1	47 24.8	141.1	46 40.0	142.2	1 50
40	51 11.9	140.7	50 26.7	141.7	49 41.1	142.7	48 54.9	143.7	48 08.3	144.7	40
30	52 42.6	143.6	51 55.4	144.6	51 07.6	145.6	50 19.5	146.5	49 30.8	147.5	30
20	54 07.0	146.7	53 17.7	147.7	52 28.0	148.6	51 37.7	149.5	50 47.2	150.5	20
10	55 24.3	150.1	54 32.9	151.0	53 41.1	151.9	52 49.2	152.7	51 56.6	153.6	10
1 00	56 33.8	153.8	55 40.4	154.6	54 46.8	155.4	53 52.8	156.1	52 58.5	156.9	1 00
0 50	57 34.3	157.7	56 39.2	158.4	55 43.9	159.1	54 48.2	159.7	53 52.3	160.4	0 50
40	58 25.5	161.8	57 28.8	162.5	56 31.9	163.0	55 34.8	163.6	54 37.6	164.1	40
30	59 06.2	166.2	58 08.1	166.7	57 09.7	167.1	56 11.6	167.5	55 13.1	167.9	30
20	59 36.0	170.7	58 36.8	171.0	57 37.6	171.3	56 38.3	171.6	55 39.1	171.9	20
10	59 54.0	175.3	58 54.2	175.5	57 54.4	175.6	56 54.6	175.8	55 54.8	175.9	10
0 00	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 11.4	89.0	0 22.9	88.0	0 34.3	87.1	0 45.8	86.1	6 00
5 50	2 27.2	90.5	2 38.7	89.5	2 50.0	88.5	3 01.4	87.5	3 12.6	86.5	5 50
40	4 54.5	91.0	5 05.9	90.0	5 17.3	89.0	5 28.6	88.0	5 39.8	87.0	40
30	7 21.6	91.4	7 33.1	90.4	7 44.4	89.4	7 55.7	88.4	8 06.7	87.4	30
20	9 48.9	91.9	10 00.4	90.9	10 11.8	89.9	10 22.9	88.9	10 33.9	87.9	20
10	12 16.0	92.4	12 27.6	91.4	12 38.9	90.4	12 49.9	89.4	13 01.0	88.4	10
5 00	14 43.1	92.9	14 54.8	91.9	15 06.2	90.9	15 17.4	89.9	15 28.3	88.9	5 00
4 50	17 10.1	93.4	17 21.9	92.4	17 33.4	91.4	17 44.6	90.4	17 55.4	89.3	4 50
40	19 37.1	94.0	19 49.0	92.9	20 00.7	91.9	20 11.9	90.9	20 22.7	89.8	40
30	22 03.8	94.5	22 16.0	93.5	22 27.7	92.4	22 39.1	91.4	22 49.9	90.3	30
20	24 30.6	95.1	24 42.9	94.0	24 54.9	92.9	25 06.3	91.9	25 17.2	90.8	20
10	26 57.2	95.7	27 09.8	94.6	27 21.8	93.5	27 33.4	92.4	27 44.4	91.3	10
4 00	29 23.7	96.3	29 36.5	95.2	29 48.8	94.0	30 00.5	92.9	30 11.6	91.8	4 00
3 50	31 49.8	96.9	32 03.1	95.8	32 15.6	94.6	32 27.5	93.5	32 38.8	92.3	3 50
40	34 16.0	97.6	34 29.5	96.4	34 42.3	95.3	34 54.5	94.1	35 05.9	92.9	40
30	36 41.8	98.3	36 55.7	97.1	37 08.8	95.9	37 21.2	94.7	37 32.8	93.4	30
20	39 07.4	99.1	39 21.7	97.8	39 35.3	96.6	39 47.9	95.3	39 59.8	94.0	20
10	41 32.6	99.9	41 47.4	98.6	42 01.3	97.3	42 14.5	96.0	42 26.6	94.7	10
3 00	43 57.4	100.8	44 12.8	99.5	44 27.4	98.1	44 40.8	96.7	44 53.4	95.4	3 00
2 50	46 21.8	101.7	46 37.8	100.4	46 52.8	98.9	47 06.9	97.5	47 19.8	96.1	2 50
40	48 45.7	102.8	49 02.6	101.4	49 18.2	99.9	49 32.8	98.4	49 46.2	96.9	40
30	51 08.9	104.0	51 26.5	102.5	51 43.0	100.9	51 58.1	99.3	52 12.1	97.7	30
20	53 31.4	105.3	53 50.1	103.7	54 07.5	102.0	54 23.4	100.4	54 38.0	98.7	20
10	55 53.0	106.7	56 12.8	105.0	56 30.9	103.3	56 47.9	101.5	57 03.2	99.8	10
2 00	58 13.5	108.3	58 34.4	106.5	58 54.1	104.7	59 11.9	102.8	59 28.2	100.9	2 00
1 50	60 32.5	110.1	60 54.9	108.2	61 15.8	106.3	61 34.9	104.3	61 52.2	102.3	1 50
40	62 49.8	112.3	63 14.0	110.2	63 36.6	108.2	63 57.2	106.0	64 15.7	103.9	40
30	65 04.8	114.7	65 31.1	112.6	65 55.4	110.4	66 17.8	108.1	66 38.1	105.7	30
20	67 17.0	117.7	67 45.7	115.4	68 12.5	113.0	68 37.0	110.5	68 59.1	107.9	20
10	69 25.2	121.2	69 56.8	118.7	70 26.0	116.2	70 53.5	113.5	71 18.0	110.7	10
1 00	71 28.5	125.5	72 03.5	122.9	72 36.5	120.1	73 06.7	117.2	73 34.4	114.1	1 00
0 50	73 24.4	130.7	74 03.5	128.0	74 40.2	125.1	75 14.8	121.9	75 46.5	118.5	0 50
40	75 10.5	137.3	75 54.4	134.5	76 36.4	131.5	77 15.6	128.2	77 52.3	124.5	40
30	76 42.7	145.4	77 31.5	142.8	78 19.2	139.9	79 04.5	136.5	79 47.5	132.7	30
20	77 55.8	155.4	78 50.1	153.3	79 43.3	150.8	80 35.2	147.8	81 25.3	144.3	20
10	78 43.4	167.1	79 41.7	165.9	80 39.9	164.4	81 37.4	162.6	82 34.5	160.3	10
0 00	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 57.1	85.1	1 08.5	84.1	1 20.0	83.1	1 31.3	82.2	1 42.6	81.2	6 00
5 50	3 24.0	85.6	3 35.1	84.6	3 46.2	83.6	3 57.2	82.6	4 08.3	81.6	5 50
40	5 50.7	86.0	6 01.7	85.0	6 12.6	84.1	6 23.3	83.1	6 34.0	82.1	40
30	8 17.8	86.4	8 28.4	85.4	8 39.0	84.5	8 49.5	83.5	8 59.9	82.5	30
20	10 44.7	86.9	10 55.2	85.9	11 05.7	84.9	11 15.9	83.9	11 25.9	82.9	20
10	13 11.8	87.4	13 22.2	86.4	13 32.4	85.4	13 42.4	84.4	13 52.2	83.3	10
5 00	15 38.9	87.8	15 49.2	86.8	15 59.3	85.8	16 09.0	84.8	16 18.4	83.7	5 00
4 50	18 06.0	88.3	18 16.3	87.2	18 26.2	86.2	18 35.7	85.2	18 44.9	84.1	4 50
40	20 33.2	88.8	20 43.2	87.7	20 53.1	86.7	21 02.4	85.6	21 11.4	84.5	40
30	23 00.4	89.2	23 10.5	88.1	23 20.1	87.1	23 29.2	86.0	23 38.0	84.9	30
20	25 27.6	89.7	25 37.6	88.6	25 47.2	87.5	25 56.1	86.4	26 04.7	85.3	20
10	27 54.9	90.1	28 04.8	89.0	28 14.3	87.9	28 23.2	86.8	28 31.4	85.7	10
4 00	30 22.2	90.6	30 32.0	89.5	30 41.5	88.3	30 50.2	87.2	30 58.3	86.0	4 00
3 50	32 49.3	91.1	32 59.4	90.0	33 08.7	88.8	33 17.3	87.6	33 25.4	86.4	3 50
40	35 16.5	91.7	35 26.5	90.5	35 35.9	89.2	35 44.4	88.0	35 52.2	86.8	40
30	37 43.8	92.2	37 53.9	91.0	38 03.1	89.7	38 11.5	88.4	38 19.3	87.2	30
20	40 10.8	92.8	40 21.0	91.5	40 30.4	90.2	40 38.7	88.9	40 46.4	87.6	20
10	42 37.9	93.3	42 48.2	92.0	42 57.6	90.7	43 06.0	89.3	43 13.4	87.9	10
3 00	45 04.8	94.0	45 15.3	92.6	45 24.9	91.2	45 33.2	89.8	45 40.7	88.3	3 00
2 50	47 31.6	94.6	47 42.5	93.2	47 52.0	91.7	48 00.5	90.2	48 07.9	88.8	2 50
40	49 58.3	95.4	50 09.4	93.8	50 19.2	92.3	50 27.8	90.7	50 35.1	89.2	40
30	52 24.9	96.2	52 36.2	94.5	52 46.2	92.9	52 54.4	91.3	53 02.3	89.6	30
20	54 51.1	97.0	55 02.9	95.3	55 13.3	93.6	55 22.2	91.8	55 29.5	90.1	20
10	57 17.1	98.0	57 29.4	96.1	57 40.2	94.3	57 49.3	92.4	57 56.9	90.6	10
2 00	59 42.6	99.0	59 55.6	97.1	60 07.0	95.1	60 16.3	93.1	60 24.0	91.1	2 00
1 50	62 08.0	100.2	62 21.8	98.2	62 33.5	96.0	62 43.2	93.9	62 51.2	91.7	1 50
40	64 32.4	101.7	64 47.1	99.4	64 59.9	97.1	65 10.2	94.7	65 18.4	92.4	40
30	66 56.2	103.3	67 12.1	100.8	67 25.7	98.3	67 36.7	95.7	67 45.5	93.1	30
20	69 18.8	105.2	69 36.3	102.6	69 51.3	99.8	70 03.2	96.9	70 12.4	93.9	20
10	71 40.2	107.7	71 59.5	104.7	72 16.0	101.6	72 29.2	98.3	72 39.3	95.0	10
1 00	73 59.1	110.8	74 20.8	107.4	74 39.5	103.8	74 54.4	100.1	75 05.8	96.4	1 00
0 50	76 15.0	114.9	76 40.2	111.0	77 01.4	107.0	77 18.7	102.6	77 32.0	98.1	0 50
40	78 25.5	120.5	78 55.3	116.0	79 20.8	111.2	79 41.6	106.0	79 57.1	100.5	40
30	80 27.5	128.4	81 04.0	123.4	81 35.4	117.8	82 01.0	111.4	82 21.0	104.5	30
20	82 13.2	140.1	82 58.1	134.9	83 38.6	128.6	84 13.6	120.9	84 41.1	111.7	20
10	83 30.6	157.4	84 25.3	153.5	85 18.0	148.1	86 07.0	140.4	86 49.8	128.9	10
0 00	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 04.2	76.8	0 15.8	75.8	6 10
6 00	1 53.9	80.2	2 05.2	79.2	2 16.4	78.2	2 27.6	77.2	2 38.8	76.3	6 00
5 50	4 19.1	80.6	4 29.9	79.6	4 40.6	78.6	4 51.4	77.7	5 01.9	76.7	5 50
40	6 44.4	81.1	6 54.9	80.1	7 05.2	79.1	7 15.2	78.1	7 25.2	77.1	40
30	9 10.0	81.5	9 19.9	80.5	9 29.8	79.5	9 39.4	78.5	9 48.9	77.5	30
20	11 35.7	81.9	11 45.3	80.9	11 54.7	79.9	12 03.8	78.9	12 12.8	77.9	20
10	14 01.6	82.3	14 10.8	81.3	14 19.8	80.3	14 28.5	79.3	14 36.8	78.2	10
5 00	16 27.5	82.7	16 36.3	81.7	16 45.0	80.6	16 53.1	79.6	17 01.1	78.6	5 00
4 50	18 53.6	83.1	19 02.2	82.0	19 10.3	81.0	19 18.1	79.9	19 25.4	78.9	4 50
40	21 19.9	83.5	21 28.1	82.4	21 35.8	81.3	21 43.0	80.3	21 50.1	79.2	40
30	23 46.1	83.8	23 54.0	82.7	24 01.4	81.6	24 08.4	80.6	24 14.7	79.5	30
20	26 12.7	84.2	26 20.1	83.1	26 27.1	82.0	26 33.6	80.9	26 39.5	79.8	20
10	28 39.2	84.5	28 46.4	83.4	28 53.1	82.3	28 59.1	81.1	29 04.4	80.0	10
4 00	31 05.8	84.9	31 12.6	83.7	31 19.0	82.6	31 24.5	81.4	31 29.6	80.2	4 00
3 50	33 32.5	85.2	33 39.1	84.0	33 45.0	82.8	33 50.3	81.7	33 54.7	80.4	3 50
40	35 59.3	85.6	36 05.6	84.3	36 11.2	83.1	36 15.9	81.9	36 19.9	80.6	40
30	38 26.0	85.9	38 32.2	84.6	38 37.3	83.4	38 41.7	82.1	38 45.3	80.8	30
20	40 53.0	86.2	40 53.8	84.9	41 03.6	83.6	41 07.6	82.3	41 10.6	81.0	20
10	43 20.0	86.5	43 25.5	85.2	43 30.0	83.8	43 33.6	82.5	43 36.1	81.1	10
3 00	45 47.0	86.9	45 52.2	85.5	45 56.4	84.1	45 59.5	82.6	46 01.5	81.2	3 00
2 50	48 13.9	87.3	48 19.0	85.8	48 22.9	84.3	48 25.7	82.8	48 27.0	81.3	2 50
40	50 41.1	87.6	50 45.9	86.0	50 49.5	84.5	50 51.6	82.9	50 52.6	81.3	40
30	53 08.2	88.0	53 12.8	86.3	53 16.0	84.6	53 17.7	83.0	53 18.0	81.3	30
20	55 35.4	88.3	55 39.8	86.6	55 42.6	84.8	55 43.9	83.0	55 43.6	81.2	20
10	58 02.5	88.7	58 06.7	86.8	58 09.2	84.9	58 10.1	83.0	58 09.3	81.1	10
2 00	60 29.9	89.1	60 33.8	87.1	60 35.9	85.0	60 36.2	83.0	60 34.6	81.0	2 00
1 50	62 57.2	89.5	63 00.9	87.3	63 02.7	85.1	63 02.3	82.9	63 00.0	80.7	1 50
40	65 24.3	90.0	65 28.0	87.6	65 29.4	85.2	65 28.3	82.8	65 25.3	80.4	40
30	67 51.6	90.5	67 55.0	87.8	67 56.2	85.2	67 54.6	82.5	67 50.3	79.9	30
20	70 18.8	91.0	70 22.2	88.1	70 22.9	85.1	70 20.3	82.1	70 15.2	79.2	20
10	72 46.0	91.7	72 49.6	88.3	72 49.6	84.9	72 46.3	81.6	72 39.5	78.2	10
1 00	75 13.3	92.5	75 16.6	88.6	75 16.1	84.6	75 11.6	80.7	75 03.3	76.8	1 00
0 50	77 40.0	93.5	77 44.0	88.8	77 42.7	84.1	77 36.7	79.5	77 26.0	74.9	0 50
40	80 07.0	94.9	80 11.1	89.1	80 09.0	83.2	80 01.0	77.4	79 47.1	71.9	40
30	82 33.5	97.0	82 38.5	89.3	82 34.5	81.5	82 24.0	74.0	82 05.5	66.9	30
20	84 58.9	101.0	85 05.5	89.5	85 00.0	78.0	84 43.0	67.3	84 16.2	57.9	20
10	87 20.9	111.9	87 32.9	89.8	87 21.3	67.5	86 50.5	50.5	86 07.9	38.8	10
0 00	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 27.6	74.8	0 39.4	73.8	0 50.9	72.9	1 02.7	71.9	1 14.3	70.9	6 10
6 00	2 49.8	75.3	3 00.9	74.3	3 11.9	73.3	3 22.8	72.3	3 33.7	71.3	6 00
5 50	5 12.4	75.7	5 22.8	74.7	5 33.0	73.7	5 43.3	72.7	5 53.3	71.7	5 50
40	7 35.2	76.1	7 44.9	75.1	7 54.5	74.1	8 04.1	73.1	8 13.3	72.1	40
30	9 58.3	76.5	10 07.4	75.5	10 16.2	74.5	10 25.0	73.5	10 33.5	72.5	30
20	12 21.5	76.9	12 30.0	75.9	12 38.3	74.8	12 46.4	73.8	12 54.1	72.8	20
10	14 45.0	77.2	14 52.9	76.2	15 00.5	75.2	15 07.7	74.1	15 14.8	73.1	10
5 00	17 08.7	77.5	17 16.0	76.5	17 22.9	75.5	17 29.6	74.4	17 35.9	73.4	5 00
4 50	19 32.5	77.8	19 39.3	76.8	19 45.5	75.7	19 51.4	74.7	19 57.0	73.6	4 50
40	21 56.6	78.1	22 02.6	77.1	22 08.3	76.0	22 13.6	74.9	22 18.4	73.8	40
30	24 20.7	78.4	24 26.3	77.3	24 31.1	76.2	24 35.7	75.1	24 39.7	74.0	30
20	26 45.0	78.6	26 49.9	77.5	26 54.3	76.4	26 58.1	75.3	27 01.4	74.2	20
10	29 09.4	78.8	29 13.7	77.7	29 17.4	76.6	29 20.5	75.4	29 23.1	74.3	10
4 00	31 33.9	79.0	31 37.6	77.9	31 40.7	76.7	31 43.1	75.5	31 44.9	74.4	4 00
3 50	33 58.5	79.2	34 01.7	78.0	34 03.9	76.8	34 05.7	75.6	34 06.7	74.4	3 50
40	36 23.2	79.4	36 25.7	78.2	36 27.4	76.9	36 28.4	75.7	36 28.5	74.4	40
30	38 48.0	79.5	38 49.8	78.2	38 50.8	77.0	38 51.0	75.7	38 50.2	74.4	30
20	41 12.8	79.6	41 14.0	78.3	41 14.3	77.0	41 13.8	75.6	41 12.1	74.3	20
10	43 37.7	79.7	43 38.2	78.3	43 37.7	76.9	43 36.3	75.5	43 33.8	74.2	10
3 00	46 02.5	79.7	46 02.3	78.3	46 01.1	76.9	45 58.9	75.4	45 55.4	74.0	3 00
2 50	48 27.3	79.7	48 26.5	78.2	48 24.5	76.7	48 21.1	75.2	48 16.9	73.7	2 50
40	50 52.2	79.7	50 50.6	78.1	50 47.7	76.5	50 43.6	75.0	50 38.0	73.4	40
30	53 17.1	79.6	53 14.7	77.9	53 10.9	76.3	53 05.5	74.6	52 59.0	73.0	30
20	55 41.9	79.5	55 38.7	77.7	55 33.8	75.9	55 27.6	74.2	55 19.5	72.4	20
10	58 06.6	79.3	58 02.4	77.4	57 56.5	75.5	57 48.9	73.6	57 39.6	71.8	10
2 00	60 31.2	78.9	60 26.0	76.9	60 18.8	74.9	60 10.0	72.9	59 59.2	71.0	2 00
1 50	62 55.5	78.5	62 49.3	76.3	62 40.6	74.2	62 30.3	72.0	62 17.9	69.9	1 50
40	65 19.7	78.0	65 11.9	75.6	65 02.1	73.3	64 50.1	70.9	64 35.7	68.6	40
30	67 43.5	77.2	67 34.3	74.6	67 22.6	72.1	67 08.6	69.6	66 52.0	67.1	30
20	70 06.9	76.3	69 56.0	73.4	69 42.1	70.5	69 25.8	67.8	69 06.8	65.1	20
10	72 29.5	74.9	72 16.5	71.7	72 00.3	68.6	71 41.0	65.5	71 19.0	62.6	10
1 00	74 51.2	73.1	74 35.3	69.4	74 15.9	65.9	73 53.6	62.5	73 27.8	59.3	1 00
0 50	77 11.0	70.5	76 52.0	66.2	76 28.7	62.3	76 01.7	58.5	75 31.5	55.0	0 50
40	79 28.2	66.6	79 04.2	61.7	78 35.8	57.1	78 03.6	53.0	77 27.7	49.2	40
30	81 40.5	60.5	81 10.0	54.7	80 34.0	49.7	79 54.7	45.2	79 12.5	41.3	30
20	83 41.8	50.1	83 01.5	43.6	82 17.0	38.4	81 29.3	34.1	80 39.4	30.5	20
10	85 19.0	31.1	84 26.5	25.6	83 31.7	21.7	82 35.6	18.8	81 38.6	16.5	10
0 00	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	1 25.9	69.9	1 37.6	68.9	1 49.2	68.0	2 00.7	67.0	2 12.3	66.0	6 10
6 00	3 44.5	70.3	3 55.3	69.4	4 05.9	68.4	4 16.5	67.4	4 27.1	66.4	6 00
5 50	6 03.2	70.7	6 13.2	69.7	6 23.0	68.7	6 32.6	67.7	6 42.1	66.7	5 50
40	8 22.6	71.1	8 31.5	70.1	8 40.4	69.1	8 49.1	68.1	8 57.7	67.1	40
30	10 41.9	71.5	10 50.1	70.5	10 58.0	69.4	11 05.7	68.4	11 13.4	67.4	30
20	13 01.7	71.8	13 09.1	70.8	13 16.1	69.8	13 23.0	68.7	13 29.6	67.7	20
10	15 21.6	72.1	15 28.2	71.0	15 34.3	70.0	15 40.2	69.0	15 45.9	67.9	10
5 00	17 41.9	72.3	17 47.6	71.3	17 52.9	70.2	17 57.8	69.2	18 02.5	68.1	5 00
4 50	20 02.2	72.5	20 07.0	71.5	20 11.4	70.4	20 15.5	69.3	20 19.2	68.2	4 50
40	22 22.8	72.7	22 26.8	71.7	22 30.3	70.6	22 33.4	69.5	22 36.1	68.4	40
30	24 43.4	72.9	24 46.6	71.8	24 49.2	70.7	24 51.3	69.6	24 53.0	68.5	30
20	27 04.3	73.0	27 06.5	71.9	27 08.2	70.8	27 09.4	69.7	27 10.1	68.5	20
10	29 25.0	73.1	29 26.4	72.0	29 27.2	70.8	29 27.3	69.7	29 27.0	68.5	10
4 00	31 46.1	73.2	31 46.6	72.0	31 46.3	70.8	31 45.5	69.7	31 44.1	68.5	4 00
3 50	34 06.9	73.2	34 06.6	72.0	34 05.3	70.8	34 03.5	69.6	34 01.7	68.4	3 50
40	36 28.0	73.2	36 26.6	71.9	36 24.4	70.7	36 21.5	69.4	36 17.8	68.2	40
30	38 48.7	73.1	38 46.4	71.8	38 43.2	70.5	38 39.2	69.2	38 34.4	68.0	30
20	41 09.8	73.0	41 06.4	71.6	41 02.1	70.3	40 56.9	69.0	40 50.8	67.7	20
10	43 30.4	72.8	43 26.0	71.4	43 20.6	70.0	43 14.1	68.7	43 06.7	67.3	10
3 00	45 51.0	72.6	45 45.5	71.1	45 38.8	69.7	45 31.2	68.3	45 22.5	66.8	3 00
2 50	48 11.2	72.2	48 04.5	70.7	47 56.7	69.2	47 47.7	67.8	47 37.6	66.3	2 50
40	50 31.4	71.8	50 23.5	70.3	50 14.1	68.7	50 03.8	67.2	49 52.1	65.6	40
30	52 51.0	71.3	52 41.7	69.7	52 31.0	68.1	52 19.0	66.5	52 05.7	64.8	30
20	55 10.4	70.7	54 59.6	69.0	54 47.3	67.3	54 33.6	65.6	54 18.7	63.9	20
10	57 29.0	69.9	57 16.5	68.1	57 02.6	66.3	56 47.2	64.5	56 30.2	62.7	10
2 00	59 46.9	69.0	59 32.8	67.1	59 16.9	65.2	58 59.4	63.3	58 40.5	61.4	2 00
1 50	62 03.7	67.9	61 47.6	65.8	61 29.7	63.8	61 10.1	61.8	60 48.7	59.9	1 50
40	64 19.6	66.4	64 01.3	64.2	63 40.9	62.1	63 18.8	60.0	62 55.0	58.9	40
30	66 33.5	64.7	66 12.7	62.4	65 49.9	60.1	65 25.0	57.9	64 58.2	55.7	30
20	68 45.6	62.5	68 22.0	60.0	67 55.7	57.6	67 27.9	55.2	66 58.1	53.0	20
10	70 54.2	59.8	70 27.5	57.1	69 58.0	54.5	69 26.5	52.0	68 53.0	49.7	10
1 00	72 59.6	56.3	72 28.7	53.4	71 55.0	50.7	71 19.5	48.1	70 42.2	45.7	1 00
0 50	74 58.5	51.8	74 23.0	48.7	73 45.0	45.8	73 05.0	43.2	72 23.0	40.8	0 50
40	76 49.4	45.8	76 08.6	42.6	75 25.2	39.8	74 40.4	37.2	73 53.8	34.9	40
30	78 27.5	37.9	77 40.5	34.8	76 51.7	32.2	76 01.5	29.9	75 10.2	27.8	30
20	79 47.7	27.5	78 54.7	25.0	78 00.2	22.8	77 05.2	21.0	76 09.5	19.4	20
10	80 41.0	14.7	79 43.0	13.2	78 44.5	11.9	77 45.9	10.9	76 47.0	10.0	10
0 00	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	77 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 27.2	90.5	2 15.8	91.4	2 04.2	92.4	1 52.7	93.4	1 41.0	94.4	5 50
40	4 54.5	91.0	4 43.0	91.9	4 31.4	92.9	4 19.7	93.9	4 07.9	94.9	40
30	7 21.6	91.4	7 10.0	92.4	6 58.2	93.4	6 46.4	94.4	6 34.4	95.4	30
20	9 48.9	91.9	9 37.2	92.9	9 25.3	93.9	9 13.2	94.9	9 01.0	95.9	20
10	12 16.0	92.4	12 04.2	93.4	11 52.0	94.4	11 39.8	95.4	11 27.4	96.4	10
5 00	14 43.1	92.9	14 31.1	94.0	14 18.9	95.0	14 06.4	96.0	13 53.7	97.0	5 00
4 50	17 10.1	93.4	16 57.9	94.5	16 45.4	95.5	16 32.8	96.5	16 29.7	97.5	4 50
40	19 37.1	94.0	19 24.7	95.1	19 12.1	96.1	18 59.0	97.1	18 45.6	98.1	40
30	22 03.8	94.5	21 51.3	95.6	21 38.2	96.6	21 25.0	97.7	21 11.2	98.7	30
20	24 30.6	95.1	24 17.8	96.2	24 04.6	97.2	23 50.8	98.3	23 36.7	99.4	20
10	26 57.2	95.7	26 44.1	96.8	26 30.4	97.9	26 16.4	99.0	26 01.8	100.0	10
4 00	29 23.7	96.3	29 10.2	97.4	28 56.2	98.5	28 41.7	99.6	28 26.6	100.7	4 00
3 50	31 49.8	96.9	31 36.1	98.1	31 21.7	99.2	31 06.8	100.3	30 51.1	101.5	3 50
40	34 16.0	97.6	34 01.8	98.8	33 46.9	100.0	33 31.5	101.1	33 15.3	102.3	40
30	36 41.8	98.3	36 27.1	99.5	36 11.8	100.8	35 55.8	101.9	35 38.8	103.1	30
20	39 07.4	99.1	38 52.2	100.3	38 36.3	101.6	38 19.5	102.8	38 02.0	104.0	20
10	41 32.6	99.9	41 16.8	101.2	41 00.2	102.5	40 42.9	103.8	40 24.5	105.0	10
3 00	43 57.4	100.8	43 41.0	102.1	43 23.8	103.5	43 05.6	104.8	42 46.5	106.1	3 00
2 50	46 21.8	101.7	46 04.7	103.1	45 46.5	104.5	45 27.6	105.9	45 07.5	107.2	2 50
40	48 45.7	102.8	48 27.8	104.3	48 08.8	105.7	47 48.8	107.1	47 27.7	108.5	40
30	51 08.9	104.0	50 50.0	105.5	50 30.1	107.0	50 09.0	108.4	49 46.8	109.9	30
20	53 31.4	105.3	53 11.6	106.8	52 50.5	108.4	52 28.1	109.9	52 04.6	111.4	20
10	55 53.0	106.7	55 31.9	108.3	55 09.2	110.0	54 45.9	111.6	54 20.8	113.1	10
2 00	58 13.5	108.3	57 50.9	110.0	57 27.2	111.8	57 02.0	113.4	56 35.4	115.1	2 00
1 50	60 32.5	110.1	60 08.4	112.0	59 42.9	113.8	59 15.9	115.5	58 47.2	117.3	1 50
40	62 49.8	112.3	62 23.9	114.2	61 56.5	116.1	61 27.5	117.9	60 56.8	119.8	40
30	65 04.8	114.7	64 36.9	116.8	64 07.0	118.8	63 35.8	120.7	63 02.8	122.6	30
20	67 17.0	117.7	66 46.5	119.9	66 14.2	122.0	65 40.2	124.0	65 04.6	125.9	20
10	69 25.2	121.2	68 51.5	123.5	68 16.2	125.7	67 39.5	127.8	67 00.6	129.8	10
1 00	71 28.5	125.5	70 51.5	127.9	70 12.8	130.2	69 32.2	132.3	68 50.3	134.4	1 00
0 50	73 24.4	130.7	72 43.4	133.2	72 00.5	135.5	71 16.4	137.7	70 30.8	139.7	0 50
40	75 10.5	137.3	74 25.0	139.7	73 38.0	142.0	72 49.4	144.0	72 00.0	145.9	40
30	76 42.7	145.4	75 52.0	147.6	75 00.8	149.7	74 08.2	151.5	73 14.6	153.2	30
20	77 55.8	155.4	77 00.8	157.1	76 04.9	158.8	75 08.6	160.1	74 12.0	161.4	20
10	78 43.4	167.1	77 44.7	168.1	76 45.9	169.0	75 46.8	169.9	74 47.7	170.5	10
0 00	79 0.0	180.0	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 29.5	95.4	1 17.8	96.4	1 06.1	97.3	0 54.5	98.3	0 42.9	99.3	5 50
40	3 56.0	95.9	3 44.0	96.9	3 32.1	97.8	3 20.0	98.8	3 08.0	99.8	40
30	6 22.4	96.4	6 10.1	97.4	5 57.9	98.4	5 45.5	99.4	5 32.9	100.3	30
20	8 48.6	96.9	8 36.1	97.9	8 23.5	98.9	8 10.6	99.9	7 57.7	100.8	20
10	11 14.8	97.4	11 01.9	98.4	10 48.9	99.4	10 35.6	100.4	10 22.2	101.4	10
5 00	13 40.7	98.0	13 27.4	99.0	13 14.0	100.0	13 00.3	101.0	12 46.4	102.0	5 00
4 50	16 06.4	98.6	15 52.8	99.6	15 38.9	100.6	15 24.8	101.6	15 10.3	102.6	4 50
40	18 31.9	99.2	18 17.8	100.2	18 03.6	101.2	17 48.7	102.2	17 33.8	103.2	40
30	20 57.1	99.8	20 42.6	100.8	20 27.8	101.8	20 12.5	102.9	19 56.9	103.9	30
20	23 22.1	100.4	23 07.1	101.5	22 51.7	102.5	22 35.8	103.6	22 19.6	104.6	20
10	25 46.8	101.1	25 31.1	102.2	25 15.2	103.2	24 58.8	104.3	24 41.9	105.4	10
4 00	28 11.1	101.8	27 54.9	102.9	27 38.4	104.0	27 21.2	105.1	27 03.6	106.2	4 00
3 50	30 34.9	102.6	30 18.2	103.7	30 01.0	104.8	29 43.1	105.9	29 24.8	107.0	3 50
40	32 58.4	103.4	32 41.0	104.6	32 23.1	105.7	32 04.4	106.8	31 45.1	107.9	40
30	35 21.5	104.3	35 03.2	105.5	34 44.4	106.6	34 25.0	107.8	34 04.9	108.9	30
20	37 43.8	105.2	37 24.8	106.4	37 05.2	107.6	36 44.8	108.8	36 23.8	109.9	20
10	40 05.5	106.3	39 45.8	107.5	39 25.1	108.7	39 03.8	109.9	38 41.6	111.1	10
3 00	42 26.5	107.4	42 05.7	108.6	41 44.2	109.9	41 21.6	111.1	40 58.5	112.3	3 00
2 50	44 46.6	108.5	44 24.8	109.9	44 02.0	111.2	43 38.5	112.4	43 14.0	113.7	2 50
40	47 05.6	109.8	46 42.6	111.2	46 18.8	112.6	45 53.9	113.9	45 28.1	115.2	40
30	49 23.5	111.3	48 59.2	112.7	48 34.0	114.0	48 07.7	115.4	47 40.5	116.8	30
20	51 39.9	112.9	51 14.2	114.4	50 47.6	115.8	50 19.7	117.2	49 51.0	118.5	20
10	53 54.8	114.7	53 27.4	116.2	52 59.1	117.7	52 29.6	119.1	51 59.1	120.5	10
2 00	56 07.3	116.7	55 38.4	118.3	55 08.3	119.8	54 36.9	121.2	54 04.6	122.7	2 00
1 50	58 17.8	118.9	57 46.8	120.6	57 14.6	122.1	56 41.3	123.6	56 06.8	125.1	1 50
40	60 24.9	121.5	59 51.8	123.2	59 17.5	124.8	58 41.9	126.3	58 05.3	127.9	40
30	62 28.6	124.4	61 53.0	126.2	61 16.3	127.8	60 38.2	129.4	59 59.1	130.9	30
20	64 27.6	127.8	63 49.3	129.6	63 10.0	131.2	62 29.2	132.9	61 47.4	134.4	20
10	66 20.9	131.7	65 39.6	133.5	64 57.4	135.1	64 13.7	136.8	63 29.2	138.3	10
1 00	68 06.9	136.2	67 22.3	138.0	66 37.1	139.6	65 50.3	141.2	65 02.9	142.7	1 00
0 50	69 43.9	141.5	68 56.0	143.2	68 07.1	144.8	67 17.5	146.3	66 27.0	147.7	0 50
40	71 09.3	147.7	70 17.9	149.2	69 26.1	150.6	68 33.0	152.0	67 39.8	153.2	40
30	72 20.8	154.6	71 26.0	155.9	70 31.0	157.2	69 35.2	158.3	68 39.2	159.3	30
20	73 14.6	162.5	72 17.1	163.5	71 19.6	164.3	70 21.6	165.1	69 23.5	165.8	20
10	73 48.4	171.1	72 49.2	171.6	71 49.7	172.0	70 50.3	172.4	69 50.8	172.8	10
0 00	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 31. 1	100. 3	0 19. 2	101. 3	0 07. 6	102. 3					5 50
40	2 55. 8	100. 8	2 43. 6	101. 8	2 31. 3	102. 8	2 19. 0	103. 7	2 06. 7	104. 7	40
30	5 20. 3	101. 3	5 07. 5	102. 3	4 54. 8	103. 3	4 41. 9	104. 2	4 29. 0	105. 2	30
20	7 44. 6	101. 8	7 31. 3	102. 8	7 18. 0	103. 8	7 04. 5	104. 8	6 50. 9	105. 7	20
10	10 08. 6	102. 4	9 54. 7	103. 4	9 40. 9	104. 4	9 26. 7	105. 4	9 12. 3	106. 3	10
5 00	12 32. 2	103. 0	12 17. 8	104. 0	12 03. 3	105. 0	11 48. 4	106. 0	11 33. 4	106. 9	5 00
4 50	14 55. 5	103. 6	14 40. 5	104. 6	14 25. 3	105. 6	14 09. 7	106. 6	13 54. 1	107. 6	4 50
40	17 18. 4	104. 2	17 02. 8	105. 3	16 46. 9	106. 3	16 30. 6	107. 3	16 14. 1	108. 3	40
30	19 40. 9	104. 9	19 24. 6	106. 0	19 08. 0	107. 0	18 51. 0	108. 0	18 33. 7	109. 0	30
20	22 03. 0	105. 6	21 45. 9	106. 7	21 28. 5	107. 7	21 10. 8	108. 7	20 52. 6	109. 8	20
10	24 24. 6	106. 4	24 06. 7	107. 5	23 48. 6	108. 5	23 29. 9	109. 5	23 10. 8	110. 6	10
4 00	26 45. 5	107. 2	26, 26. 8	108. 3	26 07. 8	109. 4	25 48. 3	110. 4	25 28. 3	111. 5	4 00
3 50	29 05. 8	108. 1	28 46. 3	109. 2	28. 26. 4	110. 3	28 05. 9	111. 3	27 44. 9	112. 4	3 50
40	31 25. 4	109. 1	31 04. 9	110. 1	30 44. 1	111. 2	30 22. 6	112. 3	30 00. 6	113. 4	40
30	33 44. 1	110. 1	33 22. 7	111. 2	33 00. 8	112. 3	32 38. 3	113. 4	32 15. 2	114. 5	30
20	36 01. 9	111. 1	35 39. 6	112. 3	35 16. 5	113. 4	34 52. 9	114. 5	34 28. 6	115. 6	20
10	38 18. 9	112. 3	37 55. 3	113. 5	37 31. 1	114. 6	37 06. 3	115. 8	36 40. 7	116. 9	10
3 00	40 34. 4	113. 5	40 09. 7	114. 7	39 44. 2	115. 9	39 18. 1	117. 1	38 51. 2	118. 2	3 00
2 50	42 48. 6	114. 9	42 22. 7	116. 2	41 55. 9	117. 4	41 28. 3	118. 6	41 00. 0	119. 7	2 50
40	45 01. 5	116. 4	44 34. 0	117. 7	44 05. 8	118. 9	43 36. 7	120. 1	43 06. 9	121. 3	40
30	47 12. 5	118. 1	46 43. 3	119. 4	46 13. 6	120. 6	45 42. 9	121. 8	45 11. 5	123. 1	30
20	49 21. 2	119. 9	48 50. 6	121. 2	48 19. 1	122. 5	47 46. 8	123. 7	47 13. 6	125. 0	20
10	51 27. 7	121. 9	50 55. 2	123. 2	50 21. 9	124. 5	49 47. 7	125. 8	49 12. 7	127. 1	10
2 00	53 31. 1	124. 1	52 56. 9	125. 5	52 21. 5	126. 8	51 45. 5	128. 1	51 08. 5	129. 4	2 00
1 50	55 31. 4	126. 5	54 54. 9	128. 0	54 17. 6	129. 3	53 39. 3	130. 6	53 00. 3	131. 9	1 50
40	57 27. 5	129. 3	56 48. 9	130. 7	56 09. 3	132. 1	55 28. 7	133. 4	54 47. 6	134. 7	40
30	59 19. 0	132. 4	58 37. 8	133. 8	57 55. 9	135. 2	57 13. 1	136. 5	56 29. 5	137. 7	30
20	61 04. 7	135. 9	60 21. 0	137. 3	59 36. 6	138. 6	58 51. 3	139. 9	58 05. 3	141. 1	20
10	62 43. 7	139. 7	61 57. 3	141. 1	61 10. 3	142. 4	60 22. 4	143. 6	59 34. 0	144. 8	10
1 00	64 14. 5	144. 1	63 25. 4	145. 4	62 35. 7	146. 6	61 45. 4	147. 8	60 54. 5	148. 9	1 00
0 50	65 35. 8	149. 0	64 44. 0	150. 2	63 51. 7	151. 3	62 58. 9	152. 3	62 05. 6	153. 3	0 50
40	66 45. 9	154. 3	65 51. 5	155. 4	64 56. 8	156. 4	64 01. 7	157. 3	63 06. 2	158. 1	40
30	67 43. 0	160. 2	66 46. 3	161. 0	65 49. 3	161. 8	64 52. 3	162. 6	63 55. 0	163. 3	30
20	68 25. 2	166. 5	67 26. 7	167. 1	66 28. 1	167. 7	65 29. 5	168. 2	64 30. 7	168. 7	20
10	68 51. 2	173. 2	67 51. 6	173. 5	66 52. 0	173. 8	65 52. 5	174. 0	64 52. 6	174. 3	10
0 00	69 0. 0	180. 0	68 0. 0	180. 0	67 0. 0	180. 0	66 0. 0	180. 0	65 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 54.3	105.7	1 41.9	106.7	1 29.5	107.7	1 17.1	108.6	1 04.5	109.6	5 40
30	4 15.9	106.2	4 02.7	107.2	3 49.5	108.2	3 36.3	109.1	3 22.9	110.1	30
20	6 37.1	106.7	6 23.3	107.7	6 09.3	108.7	5 55.2	109.7	5 41.0	110.7	20
10	8 57.9	107.3	8 43.3	108.3	8 28.5	109.3	8 13.6	110.3	7 58.5	111.3	10
5 00	11 18.2	107.9	11 02.9	108.9	10 47.3	109.9	10 31.5	110.9	10 15.5	111.9	5 00
4 50	13 38.1	108.6	13 21.8	109.6	13 05.4	110.6	12 48.7	111.5	12 31.8	112.5	4 50
40	15 57.4	109.3	15 40.3	110.3	15 23.0	111.3	15 05.5	112.2	14 47.6	113.2	40
30	18 16.1	110.0	17 58.1	111.0	17 39.8	112.0	17 21.3	113.0	17 02.4	114.0	30
20	20 34.1	110.8	20 15.3	111.8	19. 56.0	112.8	19 36.5	113.8	19 16.6	114.8	20
10	22 51.4	111.6	22 31.5	112.6	22 11.3	113.6	21 50.7	114.7	21 29.7	115.7	10
4 00	25 07.9	112.5	24 47.0	113.5	24 25.8	114.5	24 04.1	115.6	23 42.0	116.6	4 00
3 50	27 23.5	113.4	27 01.6	114.5	26 39.1	115.5	26 16.3	116.6	25 53.2	117.6	3 50
40	29 38.0	114.4	29. 15.1	115.5	28 51.5	116.6	28 27.5	117.6	28 03.0	118.6	40
30	31 51.6	115.5	31 27.3	116.6	31 02.5	117.7	30 37.3	118.8	30 11.4	119.8	30
20	34 03.7	116.7	33 38.3	117.8	33 12.3	118.9	32 45.7	120.0	32 18.5	121.0	20
10	36 14.6	118.0	35 47.7	119.1	35 20.3	120.2	34 52.4	121.3	34 23.8	122.3	10
3 00	38 23.7	119.4	37 55.5	120.5	37 26.7	121.6	36 57.3	122.7	36 27.2	123.8	3 00
2 50	40 31.1	120.9	40 01.3	122.0	39 31.1	123.1	39. 00.0	124.2	38 28.5	125.3	2 50
40	42 36.4	122.5	42 05.2	123.6	41 33.2	124.8	41 00.7	125.9	40 27.4	127.0	40
30	44 39.4	124.3	44 06.4	125.4	43 32.9	126.6	42 58.5	127.7	42 23.6	128.8	30
20	46 39.7	126.2	46 05.1	127.4	45 29.7	128.5	44 53.6	129.7	44 16.8	130.8	20
10	48 37.0	128.3	48 00.4	129.5	47 23.1	130.6	46 45.1	131.8	46 06.5	132.9	10
2 00	50 30.7	130.6	49 52.3	131.8	49 13.0	132.9	48 33.7	134.1	47 52.5	135.2	2 00
1 50	52 20.5	133.1	51 39.7	134.3	50 58.4	135.4	50 16.6	136.6	49 33.9	137.7	1 50
40	54 05.5	135.9	53 22.8	137.1	52 39.3	138.2	51 55.2	139.3	51 10.5	140.4	40
30	55 45.2	138.9	55 00.0	140.1	54 14.5	141.2	53 28.3	142.3	52 41.4	143.3	30
20	57 18.6	142.3	56 31.4	143.4	55 43.4	144.5	54 55.0	145.5	54 06.1	146.5	20
10	58 45.0	146.0	57 55.3	147.0	57 05.3	148.1	56 14.7	149.0	55 23 5	149.9	10
1 00	60 03.2	149.9	59 11.3	150.9	58 19.0	151.9	57 26.3	152.8	56 33.2	153.6	1 00
0 50	61 12.1	154.3	60 18.0	155.2	59 23.7	156.0	58 29.1	156.8	57 34.0	157.5	0 50
40	62 10.5	158.9	61 14.7	159.7	60 18.3	160.4	59 22.0	161.1	58 25.2	161.7	40
30	62 57.6	163.9	62 00.0	164.5	61 02.0	165.1	60 04.1	165.6	59 06.1	166.1	30
20	63 31.9	169.1	62 33.1	169.5	61 34.1	169.9	60 35.1	170.3	59 35.8	170.6	20
10	63 52.9	174.5	62 53.2	174.7	61 53.5	174.9	60 53.7	175.1	59 53.9	175.3	10
0 00	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 52.1	110.6	0 39.5	111.6	0 27.0	112.5	0 14.4	113.5	0 01.9	114.5	5 40
30	3 09.6	111.1	2 56.2	112.1	2 42.7	113.1	2 29.1	114.0	2 15.6	115.0	30
20	5 26.8	111.6	5 12.5	112.6	4 57.9	113.6	4 43.4	114.5	4 28.8	115.5	20
10	7 43.3	112.2	7 28.1	113.2	7 12.7	114.2	6 57.1	115.1	6 41.4	116.1	10
5 00	9 59.4	112.8	9 43.2	113.8	9 26.7	114.8	9 10.0	115.7	8 53.2	116.7	5 00
4 50	12 14.7	113.5	11 57.5	114.5	11 39.9	115.5	11 22.2	116.4	11 04.4	117.4	4 50
40	14 29.5	114.2	14 11.1	115.2	13 52.5	116.2	13 33.7	117.1	13 14.7	118.1	40
30	16 43.3	115.0	16 23.9	116.0	16 04.2	117.0	15 44.2	117.9	15 24.1	118.9	30
20	18 56.4	115.8	18 35.9	116.8	18 15.0	117.8	17 53.8	118.7	17 32.5	119.7	20
10	21 08.3	116.7	20 46.7	117.7	20 24.7	118.7	20 02.3	119.6	19 39.7	120.6	10
4 00	23 19.6	117.6	22 56.8	118.6	22 33.3	119.6	22 09.7	120.6	21 45.8	121.6	4 00
3 50	25 29.3	118.6	25 05.3	119.6	24 40.7	120.6	24 15.8	121.6	23 50.4	122.6	3 50
40	27 38.1	119.7	27 12.7	120.7	26 46.7	121.7	26 20.5	122.7	25 53.8	123.7	40
30	29 45.2	120.9	29 18.4	121.9	28 51.2	122.9	28 23.6	123.9	27 55.5	124.9	30
20	31 50.9	122.1	31 22.7	123.1	30 54.0	124.2	30 24.9	125.2	29 55.3	126.2	20
10	33 54.7	123.4	33 25.1	124.4	32 55.0	125.5	32 24.3	126.5	31 53.2	127.5	10
3 00	35 56.7	124.9	35 25.5	125.9	34 53.8	126.9	34 21.6	127.9	33 48.8	129.0	3 00
2 50	37 56.3	126.4	37 23.5	127.4	36 50.3	128.5	36 16.4	129.5	35 42.1	130.5	2 50
40	39 53.6	128.1	39 19.2	129.1	38 44.1	130.2	38 08.6	131.2	37 32.5	132.2	40
30	41 48.0	129.9	41 11.9	130.9	40 35.2	132.0	39 57.8	133.0	39 20.0	134.0	30
20	43 39.5	131.8	43 01.6	132.9	42 22.9	134.0	41 43.8	135.0	41 04.2	136.0	20
10	45 27.4	134.0	44 47.4	135.0	44 07.1	136.0	43 26.2	137.1	42 44.6	138.1	10
2 00	47 11.3	136.3	46 29.5	137.3	45 47.1	138.3	45 04.2	139.3	44 20.9	140.3	2 00
1 50	48 50.8	138.8	48 07.0	139.8	47 22.7	140.8	46 37.8	141.8	45 52.5	142.7	1 50
40	50 25.3	141.5	49 39.5	142.5	48 53.0	143.4	48 06.3	144.4	47 19.1	145.3	40
30	51 54.0	144.4	51 06.2	145.4	50 18.0	146.3	49 29.2	147.2	48 40.1	148.1	30
20	53 16.7	147.5	52 26.9	148.4	51 36.4	149.3	50 45.8	150.2	49 54.8	151.0	20
10	54 32.0	150.8	53 40.4	151.7	52 48.2	152.5	51 55.6	153.3	51 02.7	154.1	10
1 00	55 39.9	154.5	54 46.2	155.3	53 52.0	156.0	52 57.7	156.7	52 03.3	157.4	1 00
0 50	56 38.9	158.3	55 43.4	159.0	54 47.7	159.6	53 51.9	160.2	52 55.8	160.8	0 50
40	57 28.6	162.3	56 31.6	162.9	55 34.4	163.5	54 37.1	163.9	53 39.7	164.5	40
30	58 07.9	166.6	57 09.6	167.0	56 11.4	167.5	55 12.9	167.8	54 14.6	168.2	30
20	58 36.7	171.0	57 37.6	171.3	56 38.2	171.6	55 39.0	171.8	54 39.6	172.1	20
10	58 54.1	175.5	57 54.4	175.6	56 54.6	175.7	55 54.8	175.9	54 54.8	176.1	10
0 00	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 12.5	89.0	0 24.9	88.1	0 37.4	87.1	0 49.9	86.1	6 00
5 50	2 26.8	90.5	2 39.2	89.5	2 51.6	88.6	3 04.0	87.6	3 16.2	86.6	5 50
40	4 53.4	91.0	5 05.9	90.0	5 18.3	89.1	5 30.6	88.1	5 42.8	87.1	40
30	7 20.2	91.6	7 32.6	90.6	7 44.9	89.6	7 57.2	88.6	8 09.3	87.6	30
20	9 46.8	92.1	9 59.4	91.1	10 11.8	90.1	10 23.9	89.1	10 35.9	88.1	20
10	12 13.4	92.6	12 26.0	91.6	12 38.4	90.6	12 50.7	89.6	13 02.6	88.6	10
5 00	14 39.9	93.2	14 52.6	92.2	15 05.2	91.2	15 17.4	90.1	15 29.3	89.1	5 00
4 50	17 06.4	93.7	17 19.2	92.7	17 31.8	91.7	17 44.1	90.7	17 56.0	89.6	4 50
40	19 32.7	94.3	19 45.8	93.3	19 58.5	92.3	20 10.8	91.2	20 22.7	90.2	40
30	21 58.9	94.9	22 12.2	93.9	22 24.9	92.8	22 37.5	91.8	22 49.4	90.7	30
20	24 25.1	95.5	24 38.6	94.5	24 51.6	93.4	25 04.1	92.3	25 16.1	91.2	20
10	26 51.0	96.2	27 04.8	95.1	27 17.9	94.0	27 30.7	92.9	27 42.8	91.8	10
4 00	29 16.8	96.9	29 30.8	95.7	29 44.3	94.6	29 57.2	93.5	30 09.5	92.4	4 00
3 50	31 42.4	97.6	31 56.6	96.4	32 10.4	95.2	32 23.6	94.1	32 36.0	93.0	3 50
40	34 07.7	98.3	34 22.4	97.1	34 36.5	95.9	34 49.9	94.7	35 02.5	93.6	40
30	36 32.7	99.1	36 47.9	97.9	37 02.3	96.6	37 16.0	95.4	37 28.8	94.2	30
20	38 57.4	99.9	39 13.1	98.7	39 28.0	97.4	39 42.0	96.1	39 55.1	94.9	20
10	41 21.8	100.8	41 38.0	99.5	41 53.2	98.2	42 07.8	96.9	42 21.2	95.6	10
3 00	43 45.7	101.8	44 02.5	100.4	44 18.4	99.1	44 33.4	97.7	44 47.1	96.4	3 00
2 50	46 09.0	102.8	46 26.5	101.4	46 43.0	100.0	46 58.4	98.6	47 13.0	97.2	2 50
40	48 31.8	103.9	48 50.1	102.5	49 07.3	101.0	49 23.4	99.5	49 38.3	98.1	40
30	50 53.8	105.2	51 13.1	103.7	51 31.1	102.1	51 47.9	100.6	52 03.4	99.1	30
20	53 15.0	106.5	53 35.2	105.0	53 54.3	103.4	54 11.9	101.7	54 28.1	100.1	20
10	55 35.0	108.1	55 56.5	106.4	56 16.4	104.7	56 35.1	103.0	56 52.2	101.3	10
2 00	57 53.9	109.8	58 16.7	108.1	58 38.0	106.2	58 57.8	104.5	59 15.8	102.6	2 00
1 50	60 11.0	111.8	60 35.4	109.9	60 58.0	108.0	61 19.2	106.1	61 38.5	104.1	1 50
40	62 26.1	114.1	62 52.3	112.1	63 17.0	110.1	63 39.6	108.0	64 00.4	105.9	40
30	64 38.8	116.7	65 07.1	114.6	65 33.1	112.4	65 58.2	110.2	66 20.8	107.9	30
20	66 48.2	119.8	67 19.0	117.5	67 48.0	115.2	68 14.8	112.9	68 39.4	110.4	20
10	68 53.1	123.4	69 27.0	121.1	69 58.8	118.6	70 28.1	116.1	70 55.5	113.4	10
1 00	70 52.6	127.8	71 29.9	125.4	72 05.0	122.8	72 37.9	120.0	73 08.3	117.1	1 00
0 50	72 44.3	133.2	73 25.5	130.6	74 04.5	128.0	74 41.8	125.0	75 16.2	121.9	0 50
40	74 25.6	139.7	75 11.4	137.2	75 55.2	134.5	76 37.1	131.5	77 16.4	128.1	40
30	75 52.7	147.7	76 43.2	145.4	77 32.2	142.8	78 19.5	139.9	79 05.2	136.6	30
20	77 00.8	157.2	77 56.1	155.4	78 50.4	153.2	79 43.6	150.8	80 35.6	147.9	20
10	77 44.8	168.1	78 43.4	167.1	79 41.8	165.9	80 40.0	164.4	81 37.5	162.6	10
0 00	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 02.3	85.1	1 14.7	84.1	1 27.1	83.2	1 39.5	82.2	1 51.8	81.2	6 00
5 50	3 28.6	85.6	3 40.8	84.6	3 52.9	83.7	4 05.0	82.7	4 16.9	81.7	5 50
40	5 54.9	86.1	6 06.9	85.1	6 18.7	84.2	6 30.5	83.2	6 42.1	82.2	40
30	8 21.3	86.6	8 33.1	85.6	8 44.8	84.6	8 56.3	83.6	9 07.7	82.6	30
20	10 47.8	87.1	10 59.5	86.1	11 10.9	85.1	11 22.2	84.1	11 33.2	83.1	20
10	13 14.5	87.6	13 25.9	86.6	13 37.3	85.6	13 48.2	84.6	13 59.0	83.6	10
5 00	15 41.0	88.1	15 52.4	87.1	16 03.5	86.1	16 14.3	85.1	16 24.8	84.0	5 00
4 50	18 07.7	88.6	18 19.1	87.6	18 30.0	86.6	18 40.6	85.5	18 50.8	84.5	4 50
40	20 34.3	89.1	20 45.6	88.1	20 56.3	87.0	21 06.9	86.0	21 16.8	84.9	40
30	23 01.1	89.6	23 12.3	88.6	23 23.0	87.5	23 33.3	86.4	23 43.1	85.3	30
20	25 27.7	90.1	25 39.0	89.1	25 49.5	88.0	25 59.7	86.9	26 09.3	85.8	20
10	27 54.5	90.7	28 05.7	89.6	28 16.3	88.5	28 26.2	87.3	28 35.7	86.2	10
4 00	30 21.2	91.2	30 32.4	90.1	30 42.8	88.9	30 52.8	87.8	31 02.1	86.6	4 00
3 50	32 47.9	91.8	32 59.1	90.6	33 09.6	89.4	33 19.5	88.2	33 28.6	87.1	3 50
40	35 14.4	92.4	35 25.8	91.1	35 36.3	89.9	35 46.1	88.7	35 55.2	87.5	40
30	37 41.1	93.0	37 52.5	91.7	38 03.2	90.5	38 12.8	89.2	38 21.8	88.0	30
20	40 07.5	93.6	40 19.1	92.3	40 29.7	91.0	40 39.6	89.7	40 48.4	88.4	20
10	42 34.0	94.3	42 45.7	92.9	42 56.5	91.6	43 06.2	90.2	43 15.1	88.9	10
3 00	45 00.2	95.0	45 12.2	93.6	45 23.0	92.2	45 33.0	90.8	45 41.8	89.4	3 00
2 50	47 26.2	95.7	47 38.5	94.3	47 49.7	92.8	47 59.7	91.4	48 08.5	89.9	2 50
40	49 52.1	96.5	50 04.8	95.0	50 16.2	93.5	50 26.4	92.0	50 35.2	90.4	40
30	52 17.8	97.4	52 30.9	95.8	52 42.6	94.2	52 53.0	92.6	53 02.0	90.9	30
20	54 43.1	98.4	54 56.7	96.7	55 08.8	95.0	55 19.5	93.3	55 28.6	91.5	20
10	57 08.0	99.5	57 22.2	97.7	57 34.9	95.9	57 45.9	94.0	57 55.3	92.2	10
2 00	59 32.4	100.7	59 47.5	98.8	60 00.6	96.8	60 12.2	94.9	60 21.8	92.9	2 00
1 50	61 56.2	102.1	62 12.1	100.0	62 26.5	97.9	62 38.3	95.8	62 48.3	93.7	1 50
40	64 19.3	103.7	64 36.4	101.5	64 51.3	99.2	65 04.2	96.9	65 14.7	94.5	40
30	66 41.2	105.6	66 59.8	103.1	67 15.9	100.6	67 29.7	98.1	67 40.8	95.5	30
20	69 01.8	107.8	69 22.1	105.1	69 39.5	102.4	69 54.7	99.6	70 06.7	96.7	20
10	71 20.8	110.6	71 42.8	107.6	72 02.2	104.5	72 19.0	101.4	72 32.0	98.1	10
1 00	73 36.3	114.0	74 01.6	110.7	74 23.4	107.3	74 42.0	103.7	74 56.9	100.0	1 00
0 50	75 48.0	118.5	76 16.8	114.8	76 42.0	110.9	77 03.5	106.9	77 21.0	102.5	0 50
40	77 53.3	124.4	78 26.9	120.4	78 56.6	116.0	79 22.4	111.2	79 43.2	106.0	40
30	79 48.5	132.7	80 28.2	128.4	81 04.4	123.4	81 35.7	117.8	82 02.0	111.4	30
20	81 25.9	144.3	82 13.8	140.1	82 58.7	134.9	83 39.4	128.6	84 14.5	120.9	20
10	82 34.6	160.3	83 30.7	157.4	84 25.5	153.6	85 18.2	148.2	86 07.3	140.4	10
0 00	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10					0 05.2	77.8	0 17.9	76.8	0 30.7	75.8	6 10
6 00	2 04.1	80.2	2 16.4	79.2	2 28.6	78.3	2 40.8	77.3	2 53.0	76.3	6 00
5 50	4 28.9	80.7	4 40.6	79.7	4 52.5	78.7	5 04.2	77.8	5 15.7	76.8	5 50
40	6 53.7	81.2	7 05.2	80.2	7 16.4	79.2	7 27.6	78.2	7 38.6	77.2	40
30	9 18.8	81.6	9 29.8	80.7	9 40.8	79.7	9 51.4	78.7	10 01.9	77.7	30
20	11 44.0	82.1	11 54.7	81.1	12 05.1	80.1	12 15.3	79.1	12 25.3	78.1	20
10	14 09.6	82.6	14 19.8	81.5	14 29.8	80.5	14 39.6	79.5	14 49.1	78.5	10
5 00	16 35.0	83.0	16 45.0	82.0	16 54.5	80.9	17 03.9	79.9	17 12.8	78.9	5 00
4 50	19 00.8	83.4	19 10.3	82.4	19 19.6	81.3	19 28.4	80.3	19 37.0	79.2	4 50
40	21 26.5	83.9	21 35.8	82.8	21 44.6	81.7	21 53.1	80.7	22 01.1	79.6	40
30	23 52.5	84.3	24 01.4	83.2	24 09.9	82.1	24 17.9	81.0	24 25.6	79.9	30
20	26 18.5	84.7	26 27.1	83.6	26 35.2	82.5	26 42.9	81.4	26 50.0	80.2	20
10	28 44.7	85.1	28 53.0	83.9	29 00.8	82.8	29 08.1	81.7	29 14.7	80.5	10
4 00	31 10.8	85.5	31 19.0	84.3	31 26.4	83.2	31 33.3	82.0	31 39.4	80.8	4 00
3 50	33 37.3	85.9	33 45.0	84.7	33 52.3	83.5	33 58.6	82.3	34 04.4	81.1	3 50
40	36 03.5	86.3	36 11.2	85.1	36 17.9	83.8	36 24.1	82.6	36 29.3	81.4	40
30	38 30.1	86.7	38 37.4	85.4	38 43.9	84.1	38 49.7	82.9	38 54.6	81.6	30
20	40 56.5	87.1	41 03.6	85.8	41 09.9	84.5	41 15.2	83.2	41 19.7	81.8	20
10	43 23.1	87.5	43 30.0	86.2	43 36.0	84.8	43 41.0	83.4	43 45.0	82.0	10
3 00	45 49.6	87.9	45 56.4	86.5	46 02.1	85.1	46 06.7	83.6	46 10.2	82.2	3 00
2 50	48 16.3	88.4	48 22.9	86.9	48 28.4	85.4	48 32.5	83.9	48 35.7	82.4	2 50
40	50 42.9	88.8	50 49.5	87.3	50 54.6	85.7	50 58.5	84.1	51 01.0	82.5	40
30	53 08.8	89.3	53 16.0	87.6	53 21.0	86.0	53 24.5	84.3	53 26.6	82.6	30
20	55 36.3	89.8	55 42.6	88.0	55 47.3	86.3	55 50.4	84.5	55 52.0	82.7	20
10	58 03.2	90.3	58 09.2	88.4	58 13.7	86.5	58 16.5	84.6	58 17.6	82.7	10
2 00	60 29.8	90.9	60 35.9	88.9	60 40.2	86.8	60 42.6	84.8	60 43.1	82.7	2 00
1 50	62 56.7	91.5	63 02.7	89.3	63 06.8	87.1	63 08.7	84.9	63 08.7	82.7	1 50
40	65 23.1	92.2	65 29.4	89.8	65 33.2	87.4	65 35.0	84.9	65 34.2	82.5	40
30	67 49.8	92.9	67 56.2	90.3	68 00.0	87.6	68 01.0	85.0	67 59.7	82.3	30
20	70 16.2	93.8	70 22.9	90.8	70 26.4	87.9	70 27.3	84.9	70 25.0	81.9	20
10	72 42.5	94.9	72 49.6	91.6	72 53.2	88.2	72 53.4	84.8	72 50.3	81.4	10
1 00	75 08.6	96.3	75 16.1	92.4	75 19.8	88.4	75 19.4	84.5	75 15.1	80.6	1 00
0 50	77 34.4	98.0	77 42.7	93.4	77 46.4	88.7	77 45.0	84.0	77 39.5	79.3	0 50
40	79 59.0	100.5	80 09.0	94.9	80 13.1	89.0	80 11.2	83.1	80 03.1	77.3	40
30	82 22.5	104.5	82 34.5	97.0	82 40.0	89.2	82 36.3	81.4	82 25.5	73.9	30
20	84 42.0	111.7	85 00.0	101.1	85 06.5	89.5	85 01.0	77.9	84 44.0	67.1	20
10	86 50.2	128.9	87 21.4	112.0	87 33.4	89.7	87 21.8	67.5	86 50.8	50.3	10
0 00	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 43.3	74.8	0 56.1	73.8	1 08.7	72.9	1 21.4	71.9	1 34.1	70.9	6 10
6 00	3 05.1	75.3	3 17.1	74.3	3 29.1	73.4	3 41.0	72.4	3 52.9	71.4	6 00
5 50	5 27.2	75.8	5 38.6	74.8	5 49.9	73.8	6 01.1	72.8	6 12.1	71.8	5 50
40	7 49.5	76.3	8 00.2	75.3	8 10.9	74.3	8 21.3	73.2	8 31.7	72.3	40
30	10 12.2	76.7	10 22.3	75.7	10 32.3	74.7	10 42.0	73.6	10 51.6	72.6	30
20	12 35.1	77.1	12 44.6	76.1	12 53.9	75.1	13 02.9	74.0	13 11.8	73.0	20
10	14 58.3	77.5	15 07.2	76.4	15 15.8	75.4	15 24.2	74.4	15 32.3	73.4	10
5 00	17 21.5	77.8	17 29.8	76.8	17 37.9	75.8	17 45.6	74.7	17 52.9	73.7	5 00
4 50	19 45.0	78.2	19 52.8	77.1	20 00.3	76.1	20 07.3	75.0	20 13.8	74.0	4 50
40	22 08.7	78.5	22 15.9	77.4	22 22.7	76.4	22 29.0	75.3	22 35.0	74.2	40
30	24 32.6	78.8	24 39.2	77.7	24 45.4	76.6	24 51.1	75.5	24 56.2	74.4	30
20	26 56.6	79.1	27 02.6	78.0	27 08.2	76.9	27 13.1	75.8	27 17.6	74.6	20
10	29 20.7	79.4	29 26.2	78.2	29 31.2	77.1	29 35.3	76.0	29 39.2	74.8	10
4 00	31 45.0	79.7	31 49.9	78.5	31 54.2	77.3	31 57.8	76.1	32 00.8	75.0	4 00
3 50	34 09.4	79.9	34 13.7	78.7	34 17.4	77.5	34 20.3	76.3	34 22.6	75.1	3 50
40	36 33.9	80.1	36 37.7	78.9	36 40.7	77.6	36 42.8	76.4	36 44.3	75.1	40
30	38 58.5	80.3	39 01.7	79.0	39 04.1	77.8	39 05.5	76.5	39 06.2	75.2	30
20	41 23.2	80.5	41 25.7	79.2	41 27.4	77.8	41 28.1	76.5	41 28.0	75.2	20
10	43 47.9	80.6	43 49.9	79.2	43 50.8	77.9	43 50.7	76.5	43 49.7	75.1	10
3 00	46 12.6	80.8	46 14.0	79.3	46 14.3	77.9	46 13.4	76.4	46 11.5	75.0	3 00
2 50	48 37.5	80.9	48 38.1	79.3	48 37.8	77.8	48 36.0	76.3	48 33.1	74.8	2 50
40	51 02.4	80.9	51 02.4	79.3	51 01.2	77.7	50 58.5	76.2	50 54.7	74.6	40
30	53 27.3	80.9	53 26.5	79.2	53 24.5	77.6	53 20.9	75.9	53 16.0	74.2	30
20	55 52.2	80.9	55 50.7	79.1	55 47.7	77.4	55 43.0	75.6	55 37.1	73.8	20
10	58 17.0	80.8	58 14.7	78.9	58 10.9	77.0	58 05.0	75.1	57 57.7	73.3	10
2 00	60 41.9	80.7	60 38.7	78.7	60 33.7	76.6	60 26.7	74.6	60 18.1	72.6	2 00
1 50	63 06.5	80.5	63 02.4	78.3	62 56.3	76.1	62 47.9	73.9	62 37.6	71.7	1 50
40	65 31.3	80.1	65 25.8	77.7	65 18.4	75.3	65 08.5	73.0	64 56.6	70.7	40
30	67 55.5	79.6	67 49.3	77.0	67 40.1	74.4	67 22.4	71.8	67 14.5	69.3	30
20	70 19.9	79.0	70 11.8	76.0	70 00.9	73.1	69 47.2	70.2	69 31.0	67.5	20
10	72 43.4	78.0	72 33.7	74.7	72 20.7	71.5	72 04.5	68.3	71 45.5	65.3	10
1 00	75 06.9	76.7	74 54.6	72.9	74 38.9	69.2	74 19.6	65.7	73 57.2	62.3	1 00
0 50	77 28.7	74.7	77 14.0	70.3	76 54.7	66.1	76 30.7	62.1	76 04.5	58.3	0 50
40	79 49.6	71.7	79 30.5	66.4	79 06.6	61.5	78 37.9	56.9	78 06.0	52.8	40
30	82 07.0	66.8	81 41.5	60.3	81 11.5	54.6	80 35.7	49.5	79 56.2	45.0	30
20	84 17.2	57.7	83 42.7	49.9	83 02.4	43.5	82 17.8	38.2	81 30.1	33.9	20
10	86 08.4	38.7	85 19.3	30.9	84 26.7	25.5	83 32.0	21.6	82 35.8	18.7	10
0 00	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 09.5	66.5	0 23.0	65.5	6 20
10	1 46.7	69.9	1 59.3	68.9	2 11.7	68.0	2 24.3	67.0	2 36.8	66.0	10
6 00	4 04.7	70.4	4 16.4	69.4	4 28.0	68.4	4 39.6	67.5	4 51.1	66.5	6 00
5 50	6 23.1	70.9	6 33.9	69.9	6 44.7	68.9	6 55.2	67.9	7 05.7	66.9	5 50
40	8 41.9	71.3	8 51.9	70.3	9 01.7	69.3	9 11.4	68.3	9 20.9	67.3	40
30	11 01.0	71.7	11 10.2	70.6	11 19.0	69.6	11 27.8	68.6	11 36.4	67.6	30
20	13 20.3	72.0	13 28.7	71.0	13 36.9	70.0	13 44.7	68.9	13 52.3	67.9	20
10	15 40.0	72.3	15 47.6	71.3	15 54.8	70.3	16 01.7	69.2	16 08.3	68.2	10
5 00	18 00.0	72.6	18 06.7	71.6	18 13.0	70.5	18 19.0	69.5	18 24.7	68.4	5 00
4 50	20 20.1	72.9	20 25.9	71.8	20 31.4	70.8	20 36.5	69.7	20 41.2	68.6	4 50
40	22 40.4	73.1	22 45.4	72.1	22 50.1	71.0	22 54.2	69.9	22 58.0	68.8	40
30	25 00.8	73.3	25 05.2	72.2	25 08.8	71.1	25 12.1	70.0	25 14.8	68.9	30
20	27 21.5	73.5	27 24.9	72.4	27 27.7	71.3	27 30.0	70.1	27 31.8	69.0	20
10	29 42.2	73.6	29 44.7	72.5	29 46.7	71.4	29 48.0	70.2	29 48.8	69.1	10
4 00	32 03.2	73.8	32 04.8	72.6	32 05.9	71.4	32 06.1	70.2	32 05.8	69.1	4 00
3 50	34 24.0	73.8	34 24.8	72.6	34 24.8	71.4	34 24.2	70.2	34 22.8	69.0	3 50
40	36 45.0	73.9	36 44.8	72.6	36 43.9	71.4	36 42.2	70.1	36 39.8	68.9	40
30	39 05.8	73.9	39 04.9	72.6	39 02.9	71.3	39 00.2	70.0	38 56.6	68.7	30
20	41 26.8	73.8	41 24.9	72.5	41 21.9	71.2	41 17.9	69.8	41 13.2	68.5	20
10	43 47.7	73.7	43 44.7	72.3	43 40.6	70.9	43 35.5	69.6	43 29.6	68.2	10
3 00	46 08.5	73.5	46 04.4	72.1	45 59.2	70.7	45 52.9	69.2	45 45.6	67.8	3 00
2 50	48 29.1	73.3	48 23.9	71.8	48 17.3	70.3	48 09.9	68.8	48 01.1	67.3	2 50
40	50 49.5	73.0	50 43.1	71.4	50 35.5	69.9	50 26.4	68.3	50 16.4	66.7	40
30	53 09.6	72.6	53 02.0	70.9	52 53.0	69.3	52 42.5	67.6	52 30.7	66.0	30
20	55 29.5	72.1	55 20.5	70.3	55 09.9	68.6	54 57.8	66.9	54 44.5	65.2	20
10	57 48.7	71.4	57 38.1	69.6	57 26.1	67.7	57 12.3	66.0	56 57.0	64.1	10
2 00	60 07.6	70.6	59 55.4	68.7	59 41.3	66.7	59 25.7	64.8	59 08.4	62.9	2 00
1 50	62 25.5	69.6	62 11.4	67.5	61 55.4	65.5	61 37.7	63.4	61 18.2	61.5	1 50
40	64 42.6	68.4	64 26.4	66.1	64 08.2	63.9	63 47.9	61.8	63 26.1	59.7	40
30	66 58.2	66.8	66 39.7	64.4	66 18.7	62.1	65 56.0	59.8	65 31.2	57.6	30
20	69 12.2	64.9	68 50.8	62.2	68 27.2	59.7	68 01.2	57.3	67 33.5	54.9	20
10	71 23.5	62.4	70 59.0	59.5	70 32.0	56.8	70 02.5	54.2	69 31.0	51.7	10
1 00	73 31.7	59.1	73 03.1	56.0	72 32.2	53.1	71 58.7	50.4	71 23.4	47.8	1 00
0 50	75 34.2	54.7	75 01.5	51.5	74 25.7	48.4	73 47.7	45.6	73 07.7	43.0	0 50
40	77 30.2	49.0	76 51.6	45.5	76 10.6	42.3	75 27.3	39.5	74 42.3	37.0	40
30	79 14.0	41.1	78 29.0	37.6	77 42.0	34.6	76 53.2	32.0	76 02.5	29.7	30
20	80 40.2	30.3	79 48.4	27.4	78 55.2	24.9	78 00.9	22.7	77 06.0	20.9	20
10	81 38.9	16.4	80 41.2	14.6	79 43.2	13.1	78 44.7	11.9	77 46.0	11.1	10
0 00	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	78 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 26.8	90.5	2 14.2	91.5	2 01.8	92.5	1 49.1	93.5	1 36.5	94.4	5 50
40	4 53.4	91.0	4 40.9	92.0	4 28.2	93.0	4 15.6	94.0	4 02.7	95.0	40
30	7 20.2	91.6	7 07.4	92.6	6 54.7	93.5	6 41.8	94.5	6 28.8	95.5	30
20	9 46.8	92.1	9 34.0	93.1	9 21.2	94.1	9 08.0	95.1	8 54.7	96.1	20
10	12 13.4	92.6	12 00.4	93.6	11 47.4	94.6	11 34.1	95.6	11 20.6	96.6	10
5 00	14 39.9	93.2	14 26.8	94.2	14 13.6	95.2	14 00.1	96.2	13 46.2	97.2	5 00
4 50	17 06.4	93.7	16 53.1	94.8	16 39.6	95.8	16 25.9	96.8	16 11.8	97.8	4 50
40	19 32.7	94.3	19 19.3	95.4	19 05.6	96.4	18 51.4	97.4	18 36.9	98.5	40
30	21 58.9	94.9	21 45.3	96.0	21 31.2	97.0	21 16.8	98.0	21 01.9	99.1	30
20	24 25.1	95.5	24 11.2	96.6	23 56.8	97.7	23 42.0	98.7	23 26.6	99.8	20
10	26 51.0	96.2	26 36.8	97.3	26 22.0	98.4	26 06.8	99.4	25 51.2	100.5	10
4 00	29 16.8	96.9	29 02.2	98.0	28 47.2	99.1	28 31.5	100.2	28 15.2	101.3	4 00
3 50	31 42.4	97.6	31 27.3	98.7	31 11.8	99.8	30 55.7	100.9	30 38.9	102.1	3 50
40	34 07.7	98.3	33 52.3	99.5	33 36.3	100.6	33 19.5	101.7	33 02.1	102.9	40
30	36 32.7	99.1	36 16.8	100.3	36 00.3	101.5	35 42.9	102.6	35 24.9	103.8	30
20	37 59.6	99.9	37 43.4	101.1	37 26.5	102.4	37 08.8	103.6	36 50.3	104.8	20
10	41 21.8	100.8	41 04.8	102.0	40 46.9	103.3	40 28.1	104.6	40 08.7	105.8	10
3 00	43 45.7	101.8	43 27.9	103.1	43 09.4	104.4	42 49.9	105.7	42 29.3	107.0	3 00
2 50	46 09.0	102.8	45 50.5	104.1	45 31.1	105.5	45 10.6	106.8	44 49.4	108.2	2 50
40	48 31.8	103.9	48 12.4	105.3	47 52.0	106.8	47 30.6	108.1	47 08.1	109.5	40
30	50 53.8	105.2	50 33.5	106.6	50 12.1	108.1	49 49.5	109.5	49 25.9	111.0	30
20	53 15.0	106.5	52 53.5	108.1	52 31.0	109.6	52 07.2	111.1	51 42.0	112.6	20
10	55 35.0	108.1	55 12.2	109.7	54 48.4	111.3	54 23.0	112.9	53 56.6	114.4	10
2 00	57 53.9	109.8	57 29.7	111.5	57 04.3	113.2	56 37.3	114.8	56 09.1	116.4	2 00
1 50	60 11.0	111.8	59 45.1	113.6	59 18.9	115.3	58 49.2	117.0	58 19.2	118.7	1 50
40	62 26.1	114.1	61 58.4	116.0	61 29.3	117.8	60 58.6	119.6	60 26.3	121.3	40
30	64 38.8	116.7	64 08.9	118.7	63 37.5	120.6	63 04.4	122.5	62 29.8	124.3	30
20	66 48.2	119.8	66 15.7	121.9	65 41.6	123.9	65 05.9	125.8	64 28.5	127.6	20
10	68 53.1	123.4	68 17.8	125.6	67 40.6	127.7	67 01.8	129.7	66 21.8	131.6	10
1 00	70 52.6	127.8	70 13.7	130.1	69 33.2	132.2	68 51.0	134.4	68 07.5	136.2	1 00
0 50	72 44.3	133.2	72 01.4	135.5	71 17.0	137.6	70 31.5	139.6	69 44.5	141.4	0 50
40	74 25.6	139.7	73 38.5	141.9	72 50.1	144.0	72 00.5	145.8	71 09.6	147.6	40
30	75 52.7	147.7	75 01.0	149.7	74 08.5	151.5	73 14.8	153.1	72 21.0	154.6	30
20	77 00.8	157.2	76 05.0	158.8	75 08.9	160.2	74 11.9	161.4	73 14.6	162.5	20
10	77 44.8	168.1	76 45.9	169.0	75 46.9	169.8	74 47.8	170.4	73 48.5	171.0	10
0 00	78 0.0	180.0	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 23.9	95.4	1 11.2	96.4	0 58.5	97.4	0 45.9	98.3	0 33.1	99.3	5 50
40	3 49.8	96.0	3 36.9	97.0	3 23.9	97.9	3 10.8	98.9	2 57.6	99.9	40
30	6 15.8	96.5	6 02.4	97.5	5 49.1	98.5	5 35.8	99.5	5 22.2	100.4	30
20	8 41.3	97.1	8 27.9	98.0	8 14.1	99.0	8 00.3	100.0	7 46.3	101.0	20
10	11 07.1	97.6	10 53.1	98.6	10 39.1	99.6	10 24.8	100.6	10 10.3	101.6	10
5 00	13 32.2	98.2	13 18.0	99.2	13 03.5	100.2	12 48.7	101.2	12 33.8	102.2	5 00
4 50	15 57.4	98.8	15 42.8	99.8	15 27.8	100.8	15 12.6	101.9	14 57.1	102.9	4 50
40	18 22.1	99.5	18 07.1	100.5	17 51.6	101.5	17 36.0	102.5	17 19.8	103.5	40
30	20 46.8	100.1	20 31.3	101.2	20 15.4	102.2	19 59.1	103.2	19 42.4	104.3	30
20	23 10.9	100.8	22 55.0	101.9	22 38.5	102.9	22 21.6	104.0	22 04.3	105.0	20
10	25 35.0	101.5	25 18.4	102.6	25 01.4	103.7	24 43.7	104.8	24 25.8	105.8	10
4 00	27 58.4	102.3	27 41.4	103.4	27 23.5	104.5	27 05.4	105.6	26 46.6	106.7	4 00
3 50	30 21.7	103.2	30 03.8	104.3	29 45.4	105.4	29 26.4	106.5	29 06.9	107.6	3 50
40	32 44.1	104.0	32 25.7	105.2	32 06.5	106.3	31 46.8	107.4	31 26.4	108.5	40
30	35 06.3	105.0	34 47.0	106.2	34 27.1	107.3	34 06.4	108.4	33 45.1	109.5	30
20	37 27.6	106.0	37 07.6	107.2	36 46.7	108.3	36 25.2	109.5	36 02.8	110.6	20
10	39 48.4	107.0	39 27.3	108.3	39 05.6	109.5	38 43.0	110.7	38 19.7	111.8	10
3 00	42 08.2	108.2	41 46.2	109.5	41 23.3	110.7	40 59.7	111.9	40 35.2	113.1	3 00
2 50	44 27.1	109.5	44 03.9	110.8	43 40.0	112.4	43 15.2	113.3	42 49.5	114.5	2 50
40	46 44.7	110.9	46 20.6	112.2	45 55.3	113.5	45 29.2	114.8	45 02.1	116.1	40
30	49 01.2	112.4	48 35.6	113.7	48 09.0	115.1	47 41.5	116.4	47 13.1	117.7	30
20	51 16.0	114.1	50 49.1	115.5	50 21.0	116.9	49 51.8	118.2	49 21.7	119.6	20
10	53 29.1	115.9	53 00.5	117.4	52 30.7	118.8	51 59.9	120.2	51 28.2	121.6	10
2 00	55 39.8	118.0	55 09.5	119.5	54 37.9	121.0	54 05.3	122.4	53 31.6	123.8	2 00
1 50	57 48.0	120.3	57 15.6	121.9	56 42.3	123.4	56 07.5	124.9	55 31.8	126.3	1 50
40	59 52.9	123.0	59 18.5	124.6	58 42.7	126.1	58 05.9	127.7	57 27.8	129.1	40
30	61 54.0	126.0	61 17.1	127.6	60 38.9	129.1	59 59.7	130.7	59 19.3	132.2	30
20	63 50.0	129.4	63 10.6	131.1	62 29.7	132.6	61 47.9	134.2	61 04.9	135.7	20
10	65 40.5	133.3	64 57.8	135.0	64 14.0	136.6	63 29.8	138.2	62 43.8	139.6	10
1 00	67 22.9	137.9	66 37.5	139.6	65 50.6	141.1	65 03.2	142.6	64 14.5	143.9	1 00
0 50	68 56.4	143.1	68 07.5	144.7	67 17.7	146.2	66 27.2	147.6	65 36.0	148.8	0 50
40	70 18.2	149.1	69 26.4	150.6	68 33.2	151.9	67 39.9	153.1	66 45.9	154.2	40
30	71 26.2	155.9	70 31.0	157.1	69 35.2	158.2	68 39.2	159.2	67 42.8	160.1	30
20	72 17.2	163.4	71 19.7	164.3	70 21.6	165.1	69 23.5	165.8	68 25.2	166.5	20
10	72 49.2	171.5	71 49.8	172.0	70 50.3	172.5	69 50.8	172.8	68 51.2	173.1	10
0 00	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 20.4	100.3	0 07.6	101.3							5 50
40	2 44.5	100.9	2 31.3	101.8	2 18.1	102.8	2 04.8	103.8	1 51.4	104.7	40
30	5 08.5	101.4	4 54.8	102.3	4 41.1	103.2	4 27.2	104.3	4 13.3	105.3	30
20	7 32.2	102.0	7 18.0	102.9	7 03.6	103.9	6 49.1	104.9	6 34.5	105.9	20
10	9 55.6	102.6	9 40.9	103.5	9 25.9	104.5	9 10.8	105.5	8 55.5	106.5	10
5 00	12 18.6	103.2	12 03.3	104.2	11 47.6	105.2	11 31.9	106.2	11 15.8	107.1	5 00
4 50	14 41.4	103.9	14 25.3	104.8	14 09.1	105.8	13 52.6	106.8	13 35.9	107.8	4 50
40	17 03.5	104.5	16 46.9	105.5	16 30.0	106.5	16 12.7	107.5	15 55.2	108.5	40
30	19 25.4	105.3	19 08.0	106.3	18 50.4	107.3	18 32.4	108.3	18 14.1	109.3	30
20	21 46.6	106.0	21 28.5	107.1	21 10.1	108.1	20 51.3	109.1	20 32.2	110.1	20
10	24 07.4	106.8	23 48.5	107.9	23 29.3	108.9	23 09.7	109.9	22 49.7	111.0	10
4 00	26 27.4	107.7	26 07.8	108.8	25 47.7	109.8	25 27.2	110.8	25 06.2	111.9	4 00
3 50	28 46.9	108.6	28 26.4	109.7	28 05.4	110.8	27 43.8	111.8	27 21.9	112.9	3 50
40	31 05.5	109.6	30 44.1	110.7	30 22.0	111.8	29 59.6	112.8	29 36.5	113.9	40
30	33 23.4	110.7	33 00.8	111.8	32 37.8	112.9	32 14.3	113.9	31 50.2	115.0	30
20	35 40.0	111.8	35 16.5	112.9	34 52.5	114.0	34 27.7	115.1	34 02.3	116.2	20
10	37 55.7	113.0	37 31.1	114.2	37 05.8	115.3	36 39.9	116.4	36 13.3	117.5	10
3 00	40 10.1	114.3	39 44.2	115.5	39 17.7	116.7	38 50.5	117.8	38 22.5	119.0	3 00
2 50	42 23.1	115.7	41 55.9	116.9	41 28.0	118.1	40 59.3	119.3	40 30.1	120.5	2 50
40	44 34.3	117.3	44 05.8	118.5	43 36.4	119.7	43 06.3	120.9	42 35.3	122.1	40
30	46 43.7	119.0	46 13.6	120.3	45 42.7	121.5	45 11.0	122.7	44 38.5	123.9	30
20	48 50.8	120.9	48 19.1	122.2	47 46.5	123.4	47 13.1	124.6	46 38.8	125.8	20
10	50 55.5	122.9	50 21.9	124.2	49 47.5	125.5	49 12.3	126.8	48 36.3	128.0	10
2 00	52 57.1	125.2	52 21.5	126.5	51 45.3	127.8	51 08.0	129.1	50 30.0	130.3	2 00
1 50	54 55.1	127.7	54 17.6	129.0	53 39.1	130.4	52 59.9	131.7	52 19.9	132.9	1 50
40	56 49.0	130.5	56 09.3	131.8	55 28.6	133.2	54 47.3	134.5	54 04.9	135.7	40
30	58 38.0	133.6	57 55.9	134.9	57 13.0	136.3	56 29.3	137.5	55 44.9	138.7	30
20	60 21.1	137.1	59 36.6	138.4	58 51.2	139.7	58 05.1	140.9	57 18.2	142.1	20
10	61 57.3	141.0	61 10.3	142.3	60 22.4	143.5	59 33.9	144.7	58 44.7	145.8	10
1 00	63 25.5	145.2	62 35.7	146.5	61 45.4	147.7	60 54.4	148.8	60 02.9	149.8	1 00
0 50	64 44.0	150.0	63 51.7	151.1	62 58.9	152.2	62 05.5	153.2	61 12.0	154.2	0 50
40	65 51.5	155.3	64 56.8	156.3	64 01.6	157.2	63 06.2	158.0	62 10.4	158.8	40
30	66 46.3	161.0	65 49.3	161.8	64 52.3	162.5	63 54.9	163.2	62 57.5	163.8	30
20	67 26.7	167.1	66 28.1	167.6	65 29.5	168.1	64 30.8	168.6	63 31.9	169.1	20
10	67 51.6	173.4	66 52.0	173.7	65 52.5	174.0	64 52.7	174.3	63 52.8	174.5	10
0 00	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 38.1	105.7	1 24.7	106.7	1 11.3	107.7	0 57.9	108.6	0 44.5	109.6	5 40
30	3 59.2	106.2	3 45.0	107.2	3 30.9	108.2	3 16.6	109.2	3 02.3	110.1	30
20	6 19.8	106.8	6 05.0	107.8	5 50.1	108.8	5 35.0	109.8	5 19.8	110.7	20
10	8 40.1	107.4	8 24.5	108.4	8 08.7	109.4	7 52.8	110.4	7 36.8	111.3	10
5 00	10 59.7	108.1	10 43.3	109.1	10 26.8	110.1	10 10.1	111.1	9 53.1	112.0	5 00
4 50	13 18.9	108.8	13 01.7	109.8	12 44.3	110.8	12 26.7	111.8	12 08.8	112.7	4 50
40	15 37.5	109.5	15 19.5	110.5	15 01.1	111.5	14 42.6	112.5	14 23.8	113.5	40
30	17 55.4	110.3	17 36.5	111.3	17 17.3	112.3	16 57.8	113.3	16 38.0	114.3	30
20	20 12.7	111.1	19 52.8	112.1	19 32.7	113.1	19 12.1	114.1	18 51.3	115.1	20
10	22 29.2	112.0	22 08.3	113.0	21 47.2	114.0	21 25.5	115.0	21 03.7	116.0	10
4 00	24 44.8	112.9	24 22.9	113.9	24 00.7	115.0	23 38.0	116.0	23 14.9	117.0	4 00
3 50	26 59.4	113.9	26 36.5	114.9	26 13.1	116.0	25 49.3	117.0	25 25.2	118.0	3 50
40	29 13.0	115.0	28 49.0	116.0	28 24.5	117.1	27 59.5	118.1	27 34.0	119.1	40
30	31 25.4	116.1	31 00.2	117.2	30 34.5	118.3	30 08.2	119.3	29 41.5	120.3	30
20	33 36.5	117.3	33 10.0	118.4	32 43.0	119.5	32 15.4	120.5	31 47.4	121.6	20
10	35 46.1	118.6	35 18.3	119.7	34 49.8	120.8	34 20.9	121.9	33 51.5	123.0	10
3 00	37 53.9	120.1	37 24.8	121.2	36 55.0	122.3	36 24.6	123.3	35 53.6	124.4	3 00
2 50	40 00.0	121.6	39 29.3	122.7	38 58.1	123.8	38 26.1	124.9	37 53.5	126.0	2 50
40	42 03.8	123.3	41 31.6	124.4	40 58.8	125.5	40 25.2	126.6	39 51.0	127.7	40
30	44 05.3	125.1	43 31.3	126.2	42 56.8	127.3	42 21.6	128.4	41 45.7	129.5	30
20	46 04.0	127.0	45 28.3	128.2	44 52.0	129.3	44 14.9	130.4	43 37.4	131.5	20
10	47 59.5	129.2	47 22.0	130.3	46 43.8	131.5	46 04.9	132.6	45 25.4	133.6	10
2 00	49 51.4	131.5	49 11.9	132.7	48 31.8	133.8	47 51.0	134.9	47 09.6	135.9	2 00
1 50	51 39.0	134.0	50 57.6	135.2	50 15.5	136.3	49 32.6	137.4	48 49.2	138.4	1 50
40	53 22.2	136.8	52 38.5	138.0	51 54.3	139.1	51 09.4	140.2	50 24.0	141.2	40
30	54 59.6	139.8	54 13.9	141.0	53 27.5	142.1	52 40.5	143.1	51 53.0	144.1	30
20	56 31.0	143.2	55 42.9	144.3	54 54.4	145.3	54 05.3	146.3	53 15.8	147.3	20
10	57 54.9	146.9	57 04.7	147.9	56 14.1	148.9	55 22.9	149.8	54 31.5	150.7	10
1 00	59 11.1	150.8	58 18.7	151.7	57 25.9	152.6	56 32.8	153.5	55 39.3	154.3	1 00
0 50	60 17.7	155.1	59 23.5	155.9	58 28.6	156.7	57 33.4	157.5	56 38.5	158.2	0 50
40	61 14.5	159.6	60 18.1	160.3	59 21.8	161.0	58 25.1	161.6	57 28.3	162.2	40
30	61 59.7	164.4	61 01.9	165.0	60 04.1	165.5	59 06.0	166.0	58 07.7	166.5	30
20	62 33.0	169.5	61 34.0	169.9	60 35.0	170.3	59 35.9	170.6	58 36.7	170.9	20
10	62 53.2	174.7	61 53.5	174.9	60 53.7	175.1	59 53.9	175.3	58 54.1	175.4	10
0 00	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 30.9	110.6	0 17.5	111.6	0 04.0	112.5					5 40
30	2 48.2	111.1	2 33.7	112.1	2 19.2	113.1	2 04.7	114.1	1 50.3	115.1	30
20	5 04.6	111.7	4 49.3	112.7	4 34.0	113.7	4 18.5	114.6	4 03.0	115.6	20
10	7 20.6	112.3	7 04.5	113.3	6 48.1	114.3	6 31.5	115.2	6 15.0	116.2	10
5 00	9 36.1	113.0	9 18.8	114.0	9 01.4	114.9	8 43.8	115.9	8 26.2	116.9	5 00
4 50	11 50.7	113.7	11 32.6	114.7	11 14.1	115.6	10 55.5	116.6	10 36.7	117.6	4 50
40	14 04.7	114.5	13 45.4	115.5	13 26.0	116.4	13 06.2	117.4	12 46.3	118.3	40
30	16 17.8	115.3	15 57.6	116.3	15 36.9	117.2	15 16.1	118.2	14 54.9	119.1	30
20	18 30.1	116.1	18 08.7	117.1	17 46.9	118.1	17 24.9	119.1	17 02.5	120.0	20
10	20 41.3	117.0	20 18.8	118.0	19 55.8	119.0	19 32.6	120.0	19 09.1	120.9	10
4 00	22 51.6	118.0	22 27.8	119.0	22 03.6	120.0	21 39.0	121.0	21 14.2	121.9	4 00
3 50	25 00.5	119.0	24 35.6	120.0	24 10.0	121.0	23 44.3	122.0	23 18.1	123.0	3 50
40	27 08.1	120.1	26 41.8	121.1	26 15.1	122.1	25 47.8	123.1	25 20.4	124.1	40
30	29 14.2	121.3	28 46.7	122.3	28 18.5	123.3	27 50.0	124.3	27 21.0	125.3	30
20	31 18.8	122.6	30 49.7	123.6	30 20.2	124.6	29 50.1	125.6	29 19.7	126.6	20
10	33 21.4	124.0	32 51.0	125.0	32 19.9	126.0	31 48.4	127.0	31 16.5	128.0	10
3 00	35 22.1	125.4	34 50.1	126.5	34 17.5	127.5	33 44.4	128.5	33 10.9	129.5	3 00
2 50	37 20.5	127.0	36 46.9	128.1	36 12.7	129.1	35 38.0	130.1	35 02.7	131.1	2 50
40	39 16.3	128.7	38 41.0	129.8	38 05.3	130.8	37 28.8	131.8	36 52.1	132.8	40
30	41 09.3	130.6	40 32.4	131.6	39 54.8	132.6	39 16.7	133.9	38 38.1	134.6	30
20	42 59.2	132.6	42 20.4	133.6	41 41.1	134.6	41 01.1	135.6	40 20.8	136.6	20
10	44 45.3	134.7	44 04.7	135.7	43 23.7	136.7	42 42.0	137.7	41 59.7	138.7	10
2 00	46 27.7	137.0	45 45.2	138.0	45 02.1	139.0	44 18.5	140.0	43 34.5	140.9	2 00
1 50	48 05.3	139.5	47 21.0	140.5	46 35.9	141.5	45 50.6	142.4	45 04.6	143.3	1 50
40	49 38.1	142.2	48 51.7	143.2	48 04.8	144.1	47 17.3	145.0	46 29.6	145.9	40
30	51 05.1	145.2	50 16.8	146.1	49 27.8	146.9	48 38.6	147.8	47 49.0	148.6	30
20	52 25.9	148.2	51 35.4	149.1	50 44.8	149.9	49 53.5	150.8	49 02.3	151.6	20
10	53 39.5	151.5	52 47.4	152.3	51 54.8	153.1	51 01.8	153.9	50 08.6	154.6	10
1 00	54 45.6	155.1	53 51.4	155.8	52 57.2	156.5	52 02.5	157.2	51 07.8	157.9	1 00
0 50	55 42.8	158.8	54 47.4	159.5	53 51.4	160.1	52 55.4	160.7	51 59.0	161.3	0 50
40	56 31.3	162.8	55 34.1	163.3	54 36.8	163.9	53 39.3	164.4	52 41.9	164.8	40
30	57 09.5	166.9	56 11.2	167.3	55 12.7	167.7	54 14.3	168.1	53 15.6	168.5	30
20	57 37.4	171.2	56 38.1	171.5	55 38.9	171.8	54 39.5	172.0	53 40.3	172.3	20
10	57 54.3	175.6	56 54.6	175.7	55 54.7	175.9	54 54.9	176.0	53 55.0	176.1	10
0 00	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 13. 5	89. 0	0 27. 0	88. 1	0 40. 5	87. 1	0 53. 9	86. 1	6 00
5 50	2 26. 2	90. 5	2 39. 6	89. 6	2 52. 9	88. 6	2 06. 6	87. 6	2 19. 8	86. 6	5 50
40	4 52. 3	91. 1	5 05. 8	90. 2	5 19. 2	89. 2	5 32. 5	88. 2	5 45. 7	87. 2	40
30	7 18. 4	91. 7	7 32. 0	90. 7	7 45. 3	89. 7	7 58. 6	88. 7	8 11. 8	87. 8	30
20	9 44. 5	92. 3	9 58. 1	91. 3	10 11..5	90. 3	10 24. 8	89. 3	10 37. 8	88. 3	20
10	12 10. 5	92. 8	12 24. 2	91. 8	12 37. 3	90. 8	12 50. 9	89. 8	13 04. 0	88. 8	10
5 00	14 36. 4	93. 4	14 50. 2	92. 4	15 03. 8	91. 4	15 17. 1	90. 4	15 30. 1	89. 4	5 00
4 50	17 02. 2	94. 1	17 16. 3	93. 1	17 29. 8	92. 0	17 43. 2	91. 0	17 56. 2	90. 0	4 50
40	19 28. 0	94. 7	19 42. 1	93. 7	19 55. 9	92. 6	20 09. 3	91. 6	20 22. 3	90. 5	40
30	21 53. 6	95. 3	22 07. 9	94. 3	22 21. 8	93. 2	22 35. 3	92. 2	22 48. 5	91. 1	30
20	24 19. 0	96. 0	24 33. 6	94. 9	24 47. 8	93. 9	25 01. 4	92. 8	25 14. 6	91. 7	20
10	26 44. 3	96. 7	26 59. 1	95. 6	27 13. 5	94. 5	27 27. 3	93. 4	27 40. 7	92. 3	10
4 00	29 09. 4	97. 4	29 24. 5	96. 3	29 39. 1	95. 2	29 53. 3	94. 1	30 06. 7	92. 9	4 00
3 50	31 34. 2	98. 2	31 49. 8	97. 0	32 04. 6	95. 9	32 19. 0	94. 7	32 32. 6	93. 6	3 50
40	33 58. 7	99. 0	34 14. 6	97. 8	34 29. 9	96. 6	34 44. 5	95. 4	34 58. 4	94. 3	40
30	36 22. 9	99. 8	36 39. 2	98. 6	36 54. 9	97. 4	37 09. 9	96. 2	37 24. 1	95. 0	30
20	38 46. 7	100. 7	39 03. 6	99. 5	39 19. 8	98. 2	39. 35. 1	97. 0	39 49. 7	95. 7	20
10	41 10. 1	101. 7	41 27. 6	100. 4	41 44. 2	99. 1	42 00. 2	97. 8	42 15. 0	96. 5	10
3 00	43 33. 0	102. 7	43 51. 2	101. 4	44 08. 4	100. 0	44 24. 7	98. 7	44 40. 1	97. 3	3 00
2 50	45 55. 2	103. 8	46 14. 1	102. 4	46 32. 0	101. 0	46 49. 0	99. 6	47 04. 9	98. 2	2 50
40	48 16. 8	105. 0	48 36. 7	103. 6	48 55. 2	102. 1	49 12. 9	100. 7	49 29. 3	99. 2	40
30	50 37. 6	106. 3	50 58. 2	104. 9	51 17. 8	103. 4	51 36. 1	101. 8	51 53. 4	100. 3	30
20	52 57. 3	107. 8	53 19. 1	106. 3	53 39. 6	104. 7	53 59. 0	103. 1	54 17. 0	101. 5	20
10	55 16. 8	109. 5	55 38. 9	107. 8	56 00. 5	106. 2	56 20. 9	104. 5	56 39. 9	102. 8	10
2 00	57 32. 8	111. 3	57 57. 4	109. 6	58 20. 3	107. 8	58 41. 8	106. 0	59 02. 0	104. 2	2 00
1 50	59 48. 0	113. 4	60 14. 0	111. 6	60 38. 8	109. 7	61 01. 8	107. 8	61 23. 1	105. 9	1 50
40	62 01. 0	115. 8	62 29. 0	113. 9	62 55. 3	111. 9	63 20. 1	109. 9	63 43. 1	107. 8	40
30	64 11. 0	118. 5	64 41. 2	116. 5	65 09. 8	114. 4	65 36. 5	112. 3	66 01. 1	110. 1	30
20	66 17. 5	121. 7	66 50. 3	119. 6	67 21. 2	117. 4	67 50. 3	115. 1	68 17. 4	112. 7	20
10	68 19. 2	125. 5	68 55. 0	123. 3	69 28. 8	121. 0	70 00. 8	118. 5	70 30. 6	116. 0	10
1 00	70 15. 0	130. 0	70 54. 0	127. 7	71 31. 4	125. 3	72 06. 6	122. 7	72 39. 8	120. 0	1 00
0 50	72 02. 4	135. 4	72 45. 5	133. 1	73 26. 6	130. 6	74 06. 0	128. 0	74 43. 0	125. 0	0 50
40	73 39. 1	141. 9	74 26. 5	139. 7	75 12. 2	137. 2	75 56. 1	134. 5	76 38. 1	131. 5	40
30	75 01. 4	149. 7	75 53. 2	147. 6	76 43. 8	145. 4	77 33. 0	142. 8	78 20. 5	139. 9	30
20	76 05. 2	158. 8	77 01. 2	157. 2	77 56. 2	155. 4	78 50. 7	153. 3	79 44. 8	150. 8	20
10	76 46. 0	169. 0	77 44. 8	168. 1	78 43. 5	167. 1	79 41. 9	165. 9	80 40. 1	164. 4	10
0 00	77 0. 0	180. 0	78 0. 0	180. 0	79 0. 0	180. 0	80 0. 0	180. 0	81 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 07.4	85.1	1 20.8	84.2	1 34.3	83.2	1 47.6	82.2	2 01.0	81.2	6 00
5 50	2 33.1	85.7	2 46.4	84.7	3 59.6	83.7	4 12.6	82.7	4 25.6	81.7	5 50
40	5 58.9	86.2	6 11.9	85.3	6 24.8	84.3	6 37.5	83.3	6 50.3	82.3	40
30	8 24.8	86.8	8 37.6	85.8	8 50.4	84.8	9 02.9	83.8	9 15.2	82.8	30
20	10 50.7	87.3	11 03.4	86.3	11 15.9	85.3	11 28.1	84.3	11 40.3	83.3	20
10	13 16.8	87.8	13 29.3	86.8	13 41.6	85.8	13 53.8	84.8	14 05.6	83.8	10
5 00	15 42.9	88.4	15 55.3	87.4	16 07.5	86.3	16 19.3	85.3	16 30.8	84.3	5 00
4 50	18 09.0	88.9	18 21.4	87.9	18 33.4	86.9	18 45.2	85.8	18 56.4	84.8	4 50
40	20 35.1	89.5	20 47.4	88.5	20 59.3	87.4	21 10.8	86.4	21 22.0	85.3	40
30	23 01.2	90.1	23 13.6	89.0	23 25.3	87.9	23 36.9	86.9	23 47.8	85.8	30
20	25 27.4	90.6	25 39.6	89.5	25 51.5	88.4	26 02.7	87.4	26 13.5	86.3	20
10	27 53.5	91.2	28 05.8	90.1	28 17.6	89.0	28 28.9	87.9	28 39.4	86.8	10
4 00	30 19.7	91.8	30 31.9	90.7	30 43.7	89.5	30 54.8	88.4	31 05.3	87.2	4 00
3 50	32 45.7	92.4	32 58.1	91.3	33 09.8	90.1	33 21.0	88.9	33 31.4	87.7	3 50
40	35 11.7	93.1	35 24.2	91.9	35 36.0	90.7	35 47.0	89.5	35 57.4	88.2	40
30	37 37.5	93.7	37 50.1	92.5	38 02.2	91.3	38 13.4	90.0	38 23.5	88.7	30
20	40 03.4	94.4	40 16.2	93.2	40 28.3	91.9	40 39.3	90.6	40 49.6	89.3	20
10	42 29.0	95.2	42 42.1	93.9	42 54.3	92.5	43 05.5	91.2	43 15.8	89.8	10
3 00	44 54.5	96.0	45 07.9	94.6	45 20.3	93.2	45 31.6	91.8	45 41.9	90.4	3 00
2 50	47 19.8	96.8	47 33.4	95.4	47 46.1	93.9	47 57.5	92.5	48 08.2	91.0	2 50
40	49 44.7	97.7	49 58.9	96.2	50 11.9	94.7	50 23.6	93.2	50 34.2	91.6	40
30	52 09.4	98.7	52 24.1	97.1	52 37.5	95.5	52 49.6	93.9	53 00.2	92.3	30
20	54 33.6	99.8	54 49.0	98.1	55 02.8	96.4	55 15.2	94.7	55 26.3	93.0	20
10	56 57.2	101.0	57 13.4	99.2	57 27.9	97.4	57 41.0	95.6	57 52.1	93.7	10
2 00	59 20.5	102.4	59 37.4	100.5	59 52.7	98.6	60 06.1	96.6	60 18.0	94.6	2 00
1 50	61 42.8	103.9	62 00.8	101.9	62 17.0	99.8	62 31.3	97.7	62 43.7	95.6	1 50
40	64 04.3	105.7	64 23.3	103.5	64 40.7	101.3	64 55.6	99.0	65 08.8	96.7	40
30	66 24.1	107.8	66 44.9	105.4	67 03.5	103.0	67 20.0	100.5	67 33.8	98.0	30
20	68 42.5	110.2	69 05.0	107.7	69 25.4	105.0	69 43.0	102.3	69 58.4	99.5	20
10	70 58.1	113.3	71 23.0	110.5	71 45.6	107.5	72 05.4	104.5	72 22.0	101.3	10
1 00	73 10.7	117.0	73 38.6	113.9	74 03.8	110.6	74 26.0	107.2	74 44.8	103.7	1 00
0 50	75 18.0	121.9	75 50.0	118.5	76 19.7	114.8	76 44.0	110.9	77 05.7	106.9	0 50
40	77 17.9	128.1	77 54.6	124.4	78 28.5	120.4	78 58.4	116.0	79 24.1	111.2	40
30	79 05.5	136.6	79 49.0	132.7	80 29.0	128.4	81 05.5	123.4	81 37.0	117.8	30
20	80 35.9	147.9	81 26.2	144.3	82 14.3	140.2	82 59.2	135.0	83 40.1	128.7	20
10	81 37.6	162.6	82 34.7	160.4	83 30.9	157.5	84 25.7	153.6	85 18.5	148.2	10
0 00	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 04.2	78.7	0 17.9	77.8	0 31.7	76.8	0 45.4	75.8	6 10
6 00	2 14.3	80.3	2 27.6	79.3	2 40.8	78.3	2 54.0	77.3	3 07.2	76.4	6 00
5 50	4 38.5	80.8	4 51.4	79.8	5 04.2	78.8	5 16.8	77.8	5 29.4	76.9	5 50
40	7 02.8	81.3	7 15.2	80.3	7 27.6	79.3	7 39.8	78.3	7 51.9	77.4	40
30	9 27.5	81.8	9 39.5	80.8	9 51.4	79.8	10 03.1	78.8	10 14.6	77.8	30
20	11 52.2	82.3	12 03.8	81.3	12 15.3	80.3	12 26.6	79.3	12 37.6	78.3	20
10	14 17.1	82.8	14 28.5	81.8	14 39.5	80.8	14 50.3	79.8	15 00.9	78.7	10
5 00	16 42.2	83.3	16 53.1	82.3	17 03.9	81.2	17 14.2	80.2	17 24.3	79.2	5 00
4 50	19 07.5	83.8	19 18.1	82.7	19 28.4	81.7	19 38.4	80.6	19 47.9	79.6	4 50
40	21 32.7	84.2	21 43.0	83.2	21 53.1	82.1	22 02.7	81.0	22 11.8	80.0	40
30	23 58.3	84.7	24 08.4	83.6	24 17.9	82.5	24 26.9	81.4	24 35.7	80.4	30
20	26 23.8	85.2	26 33.6	84.1	26 42.9	83.0	26 51.7	81.8	27 00.0	80.7	20
10	28 49.5	85.6	28 59.2	84.5	29 08.1	83.4	29 16.4	82.2	29 24.3	81.1	10
4 00	31 15.3	86.1	31 24.5	84.9	31 33.3	83.8	31 41.3	82.6	31 48.7	81.4	4 00
3 50	33 41.2	86.5	33 50.3	85.3	33 59.6	84.2	34 06.3	83.0	34 13.3	81.8	3 50
40	36 07.0	87.0	36 15.9	85.8	36 24.1	84.6	36 31.4	83.3	36 38.1	82.1	40
30	38 33.0	87.5	38 41.8	86.2	38 49.6	84.9	38 56.7	83.7	39 02.8	82.4	30
20	40 59.0	88.0	41 07.6	86.6	41 15.2	85.3	41 22.0	84.0	41 27.8	82.7	20
10	43 25.1	88.5	43 33.6	87.1	43 41.0	85.7	43 47.4	84.3	43 52.7	83.0	10
3 00	45 51.3	89.0	45 59.5	87.5	46 06.7	86.1	46 12.8	84.7	46 17.9	83.3	3 00
2 50	48 17.4	89.5	48 25.7	88.0	48 32.5	86.5	48 38.4	85.0	48 43.0	83.5	2 50
40	50 43.6	90.0	50 51.6	88.5	50 58.5	86.9	51 04.0	85.3	51 08.4	83.7	40
30	53 09.8	90.6	53 17.8	89.0	53 24.4	87.3	53 29.7	85.6	53 33.6	83.9	30
20	55 35.8	91.2	55 43.9	89.5	55 50.4	87.7	55 55.5	85.9	55 59.0	84.2	20
10	58 01.9	91.9	58 10.1	90.0	58 16.5	88.1	58 21.4	86.2	58 24.4	84.3	10
2 00	60 27.9	92.7	60 36.2	90.6	60 42.6	88.6	60 47.2	86.6	60 49.9	84.5	2 00
1 50	62 53.9	93.4	63 02.4	91.3	63 08.7	89.1	63 13.0	86.9	63 15.1	84.6	1 50
40	65 19.7	94.3	65 28.3	92.0	65 35.0	89.6	65 39.1	87.2	65 41.1	84.7	40
30	67 45.4	95.4	67 54.7	92.8	68 01.0	90.1	68 05.0	87.4	68 06.4	84.8	30
20	70 10.8	96.6	70 20.3	93.7	70 27.3	90.7	70 31.1	87.7	70 32.1	84.7	20
10	72 35.5	98.1	72 46.2	94.8	72 53.4	91.5	72 57.1	88.0	72 57.3	84.6	10
1 00	75 00.1	100.0	75 11.6	96.3	75 19.4	92.3	75 23.2	88.3	75 23.2	84.4	1 00
0 50	77 23.4	102.5	77 36.7	97.9	77 45.0	93.3	77 49.5	88.6	77 48.0	83.9	0 50
40	79 45.2	106.0	80 01.0	100.4	80 11.2	94.8	80 15.4	88.9	80 13.4	83.0	40
30	82 03.5	111.4	82 24.0	104.5	82 36.3	97.0	82 41.5	89.2	82 38.5	81.3	30
20	84 15.3	121.0	84 43.0	111.7	85 01.0	101.0	85 07.7	89.4	85 02.2	77.8	20
10	86 07.7	140.5	86 50.6	129.0	87 21.9	112.0	87 33.9	89.7	87 22.3	67.3	10
0 00	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 59.1	74.8	1 12.7	73.9	1 26.4	72.9	1 40.1	71.9	1 53.7	70.9	6 10
6 00	3 20.2	75.4	3 33.3	74.4	3 46.2	73.4	3 59.1	72.4	4 12.0	71.5	6 00
5 50	5 41.9	75.9	5 54.3	74.9	6 06.5	73.9	6 18.7	72.9	6 30.7	71.9	5 50
40	8 03.7	76.4	8 15.5	75.4	8 27.1	74.4	8 38.6	73.4	8 49.9	72.4	40
30	10 25.9	76.8	10 37.0	75.8	10 48.0	74.8	10 58.7	73.8	11 09.3	72.8	30
20	12 48.4	77.3	12 59.0	76.3	13 09.2	75.3	13 19.3	74.3	13 29.2	73.2	20
10	15 11.2	77.7	15 21.1	76.7	15 30.7	75.7	15 40.1	74.7	15 49.3	73.6	10
5 00	17 33.9	78.1	17 43.4	77.1	17 52.5	76.1	18 01.2	75.0	18 09.7	74.0	5 00
4 50	19 57.3	78.5	20 05.9	77.5	20 14.4	76.4	20 22.6	75.4	20 30.2	74.3	4 50
40	22 20.4	78.9	22 28.8	77.8	22 36.6	76.7	22 44.0	75.7	22 51.0	74.6	40
30	24 44.0	79.3	24 51.7	78.2	24 58.9	77.1	25 05.7	76.0	25 12.1	74.9	30
20	27 07.6	79.6	27 14.9	78.5	27 21.5	77.4	27 27.7	76.3	27 33.3	75.2	20
10	29 31.6	80.0	29 38.1	78.8	29 44.2	77.7	29 49.7	76.5	29 54.6	75.4	10
4 00	31 55.4	80.3	32 01.6	79.1	32 07.1	77.9	32 11.9	76.7	32 16.1	75.6	4 00
3 50	34 19.7	80.6	34 25.2	79.3	34 30.1	78.1	34 34.3	76.9	34 37.7	75.7	3 50
40	36 43.8	80.8	36 48.9	79.6	36 53.1	78.3	36 56.7	77.1	36 59.3	75.8	40
30	39 08.3	81.1	39 12.7	79.8	39 16.3	78.5	39 19.2	77.2	39 21.1	75.9	30
20	41 32.6	81.4	41 36.6	80.0	41 39.6	78.7	41 41.7	77.4	41 42.9	76.0	20
10	43 57.3	81.6	44 00.6	80.2	44 03.0	78.8	44 04.4	77.4	44 04.7	76.0	10
3 00	46 21.7	81.8	46 24.7	80.4	46 26.3	78.9	46 27.0	77.4	46 26.6	76.0	3 00
2 50	48 46.5	82.0	48 48.6	80.5	48 49.8	78.9	48 49.7	77.4	48 48.3	75.9	2 50
40	51 11.2	82.2	51 12.9	80.6	51 13.2	79.0	51 12.3	77.4	51 10.0	75.8	40
30	53 36.1	82.3	53 37.0	80.6	53 37.0	78.9	53 34.9	77.2	53 31.6	75.5	30
20	56 00.9	82.4	56 01.3	80.6	56 00.0	78.8	55 57.3	77.0	55 53.1	75.2	20
10	58 25.7	82.4	58 25.4	80.5	58 23.4	78.6	58 19.7	76.7	58 14.2	74.8	10
2 00	60 50.6	82.5	60 49.6	80.4	60 46.6	78.4	60 41.8	76.3	60 35.4	74.3	2 00
1 50	63 15.6	82.4	63 13.6	80.2	63 09.6	78.0	63 03.7	75.8	62 55.5	73.6	1 50
40	65 40.3	82.3	65 37.7	79.9	65 32.4	77.5	65 25.1	75.1	65 15.6	72.7	40
30	68 05.3	82.1	68 01.3	79.4	67 55.0	76.8	67 46.0	74.1	67 34.7	71.6	30
20	70 29.8	81.7	70 25.0	78.8	70 17.0	75.8	70 06.2	72.9	69 52.8	70.1	20
10	72 54.5	81.2	72 47.7	77.8	72 38.3	74.5	72 25.3	71.3	72 09.2	68.1	10
1 00	75 18.6	80.4	75 10.6	76.5	74 58.5	72.7	74 42.7	69.0	74 23.7	65.5	1 00
0 50	77 43.0	79.2	77 32.0	74.6	77 16.7	70.1	76 58.0	65.9	76 34.5	61.8	0 50
40	80 05.6	77.2	79 52.0	71.6	79 32.8	66.3	79 09.0	61.3	78 40.7	56.7	40
30	82 27.3	73.8	82 08.5	66.7	81 43.5	60.2	81 13.0	54.4	80 37.5	49.3	30
20	84 45.3	67.0	84 18.3	57.6	83 43.7	49.7	83 03.4	43.3	82 18.7	38.0	20
10	86 51.4	50.2	86 08.8	38.6	85 19.7	30.8	84 27.0	25.4	83 32.2	21.5	10
0 00	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20			0 04.6	68.5	0 19.0	67.5	0 33.4	66.5	0 47.9	65.5	6 20
10	2 07.2	70.0	2 20.6	69.0	2 34.2	68.0	2 47.7	67.0	3 01.2	66.0	10
6 00	4 24.7	70.5	4 37.4	69.5	4 50.0	68.5	5 02.6	67.5	5 15.0	66.5	6 00
5 50	6 42.7	70.9	6 54.6	70.0	7 06.2	69.0	7 17.8	68.0	7 29.3	67.0	5 50
40	9 01.1	71.4	9 12.1	70.4	9 22.9	69.4	9 33.6	68.4	9 44.0	67.4	40
30	11 19.7	71.8	11 29.9	70.8	11 39.8	69.8	11 49.6	68.8	11 59.1	67.7	30
20	13 38.8	72.2	13 48.1	71.2	13 57.3	70.2	14 06.2	69.2	14 14.7	68.1	20
10	15 58.2	72.6	16 06.7	71.6	16 14.9	70.5	16 23.6	69.5	16 30.5	68.4	10
5 00	18 17.7	73.0	18 25.5	71.9	18 32.8	70.8	18 40.0	69.8	18 46.6	68.8	5 00
4 50	20 37.3	73.3	20 44.5	72.2	20 51.0	71.7	20 57.2	70.1	21 02.9	69.0	4 50
40	22 57.6	73.5	23 03.7	72.5	23 09.5	71.4	23 14.7	70.3	23 19.5	69.2	40
30	25 17.8	73.8	25 23.2	72.7	25 28.0	71.6	25 32.2	70.5	25 36.2	69.4	30
20	27 38.3	74.0	27 42.8	72.9	27 46.8	71.8	27 50.2	70.6	27 53.0	69.5	20
10	29 58.8	74.2	30 02.6	73.1	30 05.6	71.9	30 08.1	70.7	30 09.9	69.6	10
4 00	32 19.5	74.4	32 22.4	73.2	32 24.6	72.0	32 26.2	70.8	32 26.9	69.7	4 00
3 50	34 40.3	74.5	34 42.4	73.3	34 43.6	72.1	34 44.2	70.9	34 44.0	69.7	3 50
40	37 01.2	74.6	37 02.4	73.4	37 02.7	72.1	37 02.4	70.8	37 01.0	69.6	40
30	39 22.2	74.7	39 22.4	73.4	39 21.7	72.1	39 20.3	70.8	39 17.9	69.5	30
20	41 43.1	74.7	41 42.5	73.3	41 40.8	72.0	41 38.3	70.7	41 34.7	69.3	20
10	44 04.0	74.6	44 02.5	73.2	43 59.7	71.8	43 56.1	70.5	43 51.4	69.0	10
3 00	46 25.0	74.5	46 22.3	73.1	46 18.6	71.7	46 13.8	70.2	46 07.8	68.7	3 00
2 50	48 45.7	74.4	48 42.1	72.9	48 37.1	71.4	48 31.1	69.9	48 23.8	68.4	2 50
40	51 06.5	74.2	51 01.6	72.6	50 55.5	71.0	50 48.2	69.4	50 39.4	67.9	40
30	53 26.9	73.9	53 20.9	72.2	53 13.5	70.5	53 04.7	68.8	52 54.5	67.2	30
20	55 47.3	73.5	55 39.9	71.7	55 31.2	70.0	55 20.9	68.2	55 08.9	66.5	20
10	58 07.1	72.9	57 58.3	71.1	57 48.0	69.2	57 36.1	67.4	57 22.5	65.5	10
2 00	60 26.7	72.3	60 16.3	70.3	60 04.3	68.3	59 50.6	66.4	59 35.0	64.5	2 00
1 50	62 45.6	71.4	62 33.5	69.3	62 19.5	67.2	62 03.7	65.1	61 46.2	63.1	1 50
40	65 03.6	70.4	64 49.7	68.1	64 33.7	65.8	64 15.7	63.6	63 55.5	61.5	40
30	67 20.9	69.0	67 04.5	66.5	66 46.9	64.1	66 25.3	61.7	66 02.6	59.4	30
20	69 36.3	67.3	69 17.7	64.6	68 56.4	61.9	68 33.0	59.4	68 07.0	57.0	20
10	71 50.2	65.1	71 28.2	62.1	71 03.7	59.2	70 35.5	56.5	70 07.2	53.9	10
1 00	74 01.0	62.1	73 35.5	58.8	73 07.1	55.7	72 36.3	52.8	72 02.7	50.1	1 00
0 50	76 07.7	58.1	75 37.5	54.5	75 04.7	51.2	74 28.7	48.1	73 50.7	45.3	0 50
40	78 08.2	52.5	77 32.5	48.7	76 53.9	45.3	76 12.8	42.1	75 29.3	39.3	40
30	79 58.0	44.8	79 15.0	40.8	78 30.0	37.4	77 43.5	34.4	76 54.5	31.8	30
20	81 31.1	33.7	80 40.9	30.2	79 49.0	27.2	78 56.1	24.7	78 01.5	22.6	20
10	82 36.1	18.6	81 39.1	16.3	80 41.4	14.5	79 43.3	13.0	78 44.9	11.8	10
0 00	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	79 0.0	0.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 26.2	90.5	2 12.7	91.5	1 58.9	92.5	1 45.6	93.5	1 31.8	94.5	5 50
40	4 52.3	91.1	4 38.7	92.1	4 25.1	93.1	4 11.2	94.1	3 57.4	95.0	40
30	7 18.4	91.7	7 04.8	92.7	6 50.9	93.7	6 37.1	94.6	6 23.0	95.6	30
20	9 44.5	92.3	9 30.7	93.3	9 16.7	94.3	9 02.6	95.2	8 48.3	96.2	20
10	12 10.5	92.8	11 56.7	93.9	11 42.5	94.9	11 28.2	95.8	11 13.6	96.8	10
5 00	14 36.4	93.4	14 22.3	94.5	14 08.0	95.5	13 53.4	96.5	13 38.6	97.5	5 00
4 50	17 02.2	94.1	16 47.4	95.1	16 33.4	96.1	16 18.6	97.1	16 03.4	98.1	4 50
40	19 28.0	94.7	19 13.5	95.7	18 58.7	96.7	18 43.5	97.8	18 27.9	98.8	40
30	21 53.6	95.3	21 38.9	96.4	21 23.7	97.4	21 08.2	98.5	20 52.2	99.5	30
20	24 19.0	96.0	24 04.0	97.1	23 48.5	98.1	23 32.6	99.2	23 16.3	100.2	20
10	26 44.3	96.7	26 28.9	97.8	26 13.1	98.8	25 56.8	99.9	25 39.9	101.0	10
4 00	29 09.4	97.4	28 53.6	98.5	28 37.3	99.6	28 20.6	100.7	28 03.2	101.8	4 00
3 50	31 34.2	98.2	31 18.1	99.3	31 01.2	100.4	30 44.1	101.5	30 26.1	102.6	3 50
40	33 58.7	99.0	33 42.1	100.1	33 24.9	101.3	33 06.9	102.4	32 48.4	103.5	40
30	36 22.9	99.8	36 05.8	101.0	35 47.9	102.2	35 29.5	103.3	35 10.2	104.5	30
20	38 46.7	100.7	38 29.0	110.9	38 10.6	103.1	37 51.3	104.3	37 31.4	105.5	20
10	41 10.1	101.7	40 51.8	102.9	40 32.2	104.2	40 12.8	105.4	39 51.9	106.6	10
3 00	43 33.0	102.7	43 13.9	104.0	42 54.0	105.3	42 33.1	106.6	42 11.5	107.9	3 00
2 50	45 55.2	103.8	45 35.3	105.2	45 14.5	106.5	44 52.8	107.8	44 30.2	109.1	2 50
40	48 16.8	105.0	47 56.1	106.4	47 34.2	107.8	47 11.4	109.2	46 47.6	110.5	40
30	50 37.6	106.3	50 15.8	107.8	49 52.8	109.3	49 28.8	110.7	49 03.8	112.1	30
20	52 57.3	107.8	52 34.3	109.3	52 10.1	110.8	51 44.9	112.3	51 18.5	113.8	20
10	55 16.8	109.5	54 51.5	111.0	54 25.9	112.6	53 59.2	114.1	53 31.2	115.6	10
2 00	57 32.8	111.3	57 07.1	112.9	56 39.9	114.6	56 11.4	116.2	55 41.9	117.7	2 00
1 50	59 48.0	113.4	59 20.5	115.1	58 51.5	116.8	58 21.4	118.5	57 49.9	120.1	1 50
40	62 01.0	115.8	61 31.5	117.6	61 00.4	119.4	60 28.1	121.1	59 54.6	122.8	40
30	64 11.0	118.5	63 39.2	120.4	63 06.0	122.3	62 31.4	124.1	61 55.2	125.8	30
20	66 17.5	121.7	65 43.2	123.7	65 07.3	125.7	64 29.9	127.5	63 51.3	129.3	20
10	68 19.2	125.5	67 42.1	127.6	67 03.1	129.6	66 22.8	131.4	65 41.2	133.2	10
1 00	70 15.0	130.0	69 34.2	132.2	68 52.1	134.1	68 08.4	136.0	67 23.7	137.8	1 00
0 50	72 02.4	135.4	71 18.0	137.5	70 32.0	139.5	69 45.0	141.4	68 57.0	143.1	0 50
40	73 39.1	141.9	72 50.7	143.9	72 00.9	145.8	71 10.1	147.5	70 18.6	149.1	40
30	75 01.4	149.7	74 09.0	151.4	73 15.2	153.1	72 21.2	154.5	71 26.2	155.9	30
20	76 05.2	158.8	75 08.8	160.1	74 12.0	161.3	73 14.9	162.4	72 17.3	163.4	20
10	76 46.0	169.0	75 46.9	169.8	74 47.8	170.4	73 48.5	171.0	72 49.2	171.5	10
0 00	77 0.0	180.0	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 18.2	95.4	1 04.6	96.4	0 50.9	97.4	0 37.1	98.4	0 23.4	99.3	5 50
40	3 43.6	96.0	3 29.6	97.0	3 15.6	98.0	3 01.5	98.9	2 47.4	99.9	40
30	6 08.9	96.6	5 54.7	97.6	5 40.3	98.6	5 25.9	99.5	5 11.2	100.5	30
20	8 34.0	97.2	8 19.3	98.2	8 04.7	99.2	7 49.8	100.1	7 34.8	101.1	20
10	10 59.0	97.8	10 44.0	98.8	10 28.9	99.8	10 13.6	100.7	9 58.2	101.7	10
5 00	13 23.6	98.5	13 08.2	99.5	12 52.7	100.5	12 37.0	101.4	12 21.0	102.4	5 00
4 50	15 48.1	99.1	15 32.4	100.1	15 16.4	101.1	15 00.2	102.1	14 43.6	103.1	4 50
40	18 12.2	99.8	17 56.0	100.8	17 39.6	101.8	17 22.7	102.8	17 05.7	103.8	40
30	20 36.1	100.5	20 19.5	101.5	20 02.4	102.5	19 45.2	103.6	19 27.4	104.6	30
20	22 59.6	101.3	22 42.4	102.3	22 24.9	103.3	22 06.9	104.4	21 48.5	105.4	20
10	25 22.8	102.1	25 05.0	103.1	24 46.9	104.1	24 28.3	105.2	24 09.2	106.2	10
4 00	27 45.5	102.9	27 27.1	103.9	27 08.3	105.0	26 48.9	106.1	26 29.2	107.1	4 00
3 50	30 07.7	103.7	29 48.8	104.8	29 29.2	105.9	29 09.2	107.0	28 48.6	108.1	3 50
40	32 29.4	104.7	32 09.6	105.8	31 49.4	106.9	31 28.5	108.0	31 07.1	109.1	40
30	34 50.4	105.7	34 30.0	106.8	34 08.9	107.9	33 47.2	109.1	33 24.7	110.2	30
20	37 10.8	106.7	36 49.4	107.9	36 27.6	109.0	36 04.7	110.2	35 41.4	111.3	20
10	39 30.4	107.8	39 08.2	109.1	38 45.2	110.2	38 21.4	111.4	37 57.0	112.6	10
3 00	41 49.0	109.1	41 25.7	110.3	41 01.7	111.5	40 36.8	112.7	40 11.3	113.9	3 00
2 50	44 06.8	110.4	43 42.2	111.7	43 17.1	112.9	42 51.0	114.1	42 24.3	115.3	2 50
40	46 23.0	111.9	45 57.4	113.2	45 30.9	114.4	45 03.5	115.7	44 35.4	116.9	40
30	48 37.9	113.5	48 11.0	114.8	47 43.3	116.1	47 14.3	117.4	46 44.6	118.7	30
20	50 51.1	115.2	50 22.7	116.6	49 53.3	117.9	49 22.9	119.3	48 51.7	120.6	20
10	53 02.3	117.1	52 32.2	118.6	52 01.3	119.9	51 29.3	121.3	50 56.2	122.6	10
2 00	55 11.2	119.2	54 39.3	120.7	54 06.5	122.2	53 32.6	123.6	52 57.8	124.9	2 00
1 50	57 17.1	121.7	56 43.5	123.2	56 08.6	124.7	55 32.6	126.1	54 55.9	127.4	1 50
40	59 19.9	124.4	58 43.7	125.9	58 06.8	127.4	57 28.5	128.9	56 49.5	130.2	40
30	61 18.2	127.4	60 39.9	128.9	60 00.4	130.5	59 20.0	132.0	58 38.4	133.4	30
20	63 11.6	130.9	62 30.4	132.5	61 48.5	134.0	61 05.4	135.5	60 21.6	136.9	20
10	64 58.6	134.9	64 14.8	136.5	63 30.0	138.0	62 44.3	139.5	61 57.7	140.8	10
1 00	66 38.1	139.4	65 51.2	141.0	65 03.5	142.5	64 14.9	143.9	63 25.8	145.2	1 00
0 50	68 08.0	144.6	67 18.2	146.1	66 27.6	147.4	65 36.2	148.7	64 44.2	149.9	0 50
40	69 26.5	150.5	68 33.5	151.8	67 40.2	153.0	66 46.0	154.2	65 51.6	155.2	40
30	70 31.0	157.0	69 35.4	158.1	68 39.4	159.1	67 43.0	160.1	66 46.3	160.9	30
20	71 19.7	164.3	70 21.7	165.1	69 23.6	165.8	68 25.2	166.3	67 26.7	167.0	20
10	71 49.8	172.0	70 50.4	172.4	69 50.9	172.8	68 51.3	173.1	67 51.7	173.4	10
0 00	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 09.6	100.3									5 50
40	2 33.2	100.9	2 19.0	101.9	2 04.8	102.8	1 50.5	103.8	1 36.2	104.8	40
30	4 56.7	101.5	4 41.9	102.4	4 27.2	103.4	4 12.3	104.4	3 57.3	105.4	30
20	7 19.7	102.1	7 04.5	103.1	6 49.1	104.0	6 33.6	105.5	6 18.1	106.0	20
10	9 42.5	102.7	9 26.7	103.7	9 10.7	104.7	8 54.7	105.7	8 38.4	106.6	10
5 00	12 04.8	103.4	11 48.4	104.4	11 31.9	105.4	11 15.0	106.3	10 58.1	107.3	5 00
4 50	14 26.9	104.1	14 09.8	105.1	13 52.6	106.1	13 35.2	107.0	13 17.4	108.0	4 50
40	16 48.3	104.8	16 30.6	105.8	16 12.7	106.8	15 54.6	107.8	15 36.1	108.8	40
30	19 09.4	105.6	18 51.0	106.6	18 32.4	107.6	18 13.3	108.6	17 54.1	109.6	30
20	21 29.8	106.4	21 10.8	107.4	20 51.3	108.4	20 31.5	109.5	20 11.4	110.5	20
10	23 49.8	107.3	23 30.0	108.3	23 09.7	109.3	22 49.0	110.4	22 27.9	111.4	10
4 00	26 09.0	108.2	25 48.3	109.2	25 27.2	110.3	25 05.6	111.3	24 43.6	112.3	4 00
3 50	28 27.5	109.2	28 05.9	110.2	27 43.9	111.3	27 21.3	112.3	26 58.3	113.3	3 50
40	30 45.1	110.2	30 22.6	111.2	29 59.6	112.3	29 36.0	113.4	29 12.0	114.4	40
30	33 01.8	111.3	32 38.4	112.4	32 14.4	113.5	31 49.7	114.6	31 24.4	115.6	30
20	35 17.4	112.5	34 52.9	113.6	34 27.7	114.7	34 01.9	115.8	33 35.6	116.8	20
10	37 32.0	113.8	37 06.3	114.9	36 39.9	116.0	36 12.9	117.1	35 45.3	118.2	10
3 00	39 45.0	115.1	39 18.1	116.2	38 50.5	117.4	38 22.1	118.5	37 53.2	119.6	3 00
2 50	41 56.6	116.6	41 28.4	117.7	40 59.3	118.9	40 29.7	120.0	39 59.7	121.2	2 50
40	44 06.4	118.2	43 36.7	119.4	43 06.3	120.6	42 35.0	121.7	42 03.3	122.9	40
30	46 14.3	120.0	45 42.9	121.2	45 11.0	122.4	44 38.3	123.5	44 04.7	124.7	30
20	48 19.6	121.8	47 46.8	123.1	47 13.1	124.3	46 38.6	125.5	46 03.5	126.7	20
10	50 22.4	123.9	49 47.7	125.2	49 12.2	126.5	48 36.0	127.7	47 58.9	128.9	10
2 00	52 22.0	126.3	51 45.5	127.5	51 08.0	128.8	50 29.9	130.0	49 51.0	131.2	2 00
1 50	54 18.0	128.8	53 39.3	130.1	52 59.9	131.5	52 19.7	132.6	51 38.6	133.8	1 50
40	56 09.6	131.6	55 28.7	132.9	54 47.3	134.2	54 04.8	135.4	53 21.9	136.6	40
30	57 56.2	134.8	57 13.2	136.1	56 29.3	137.3	55 44.6	138.5	54 59.4	139.7	30
20	59 36.8	138.3	58 51.3	139.6	58 05.1	140.8	57 18.1	141.9	56 30.8	143.0	20
10	61 10.4	142.1	60 22.4	143.3	59 33.9	144.5	58 44.6	145.6	57 54.7	146.7	10
1 00	62 35.8	146.4	61 45.4	147.5	60 54.4	148.6	60 02.9	149.7	59 11.0	150.7	1 00
0 50	63 51.9	151.1	62 58.9	152.1	62 05.6	153.1	61 12.0	154.0	60 17.6	154.9	0 50
40	64 56.8	156.2	64 01.7	157.1	63 06.2	158.0	62 10.4	158.8	61 14.5	159.5	40
30	65 49.3	161.7	64 52.3	162.4	63 54.9	163.1	62 57.5	163.8	61 59.7	164.4	30
20	66 28.1	167.6	65 29.5	168.1	64 30.8	168.6	63 31.9	169.0	62 33.1	169.4	20
10	66 52.1	173.7	65 52.5	174.0	64 52.7	174.2	63 52.9	174.5	62 53.2	174.7	10
0 00	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 21.8	105.7	1 07.5	106.7	0 53.1	107.7	0 38.7	108.7	0 24.3	109.6	5 40
30	3 42.3	106.3	3 27.2	107.3	3 12.1	108.3	2 56.8	109.3	2 41.6	110.2	30
20	6 02.4	106.9	5 46.6	107.9	5 30.6	108.9	5 14.7	109.9	4 58.6	110.8	20
10	8 22.0	107.6	8 05.4	108.6	7 48.6	109.6	7 31.7	110.5	7 15.0	111.5	10
5 00	10 40.9	108.3	10 23.6	109.3	10 06.1	110.3	9 48.5	111.2	9 30.6	112.2	5 00
4 50	12 59.5	109.0	12 41.3	110.0	12 22.9	111.0	12 04.3	112.0	11 45.6	112.9	4 50
40	15 17.3	109.8	14 48.3	110.8	14 39.0	111.8	14 19.5	112.7	13 59.8	113.7	40
30	17 34.4	110.6	17 14.6	111.6	16 54.3	112.6	16 33.8	113.5	16 13.2	114.5	30
20	19 50.9	111.5	19 30.1	112.5	19 08.9	113.5	18 47.5	114.4	18 25.7	115.4	20
10	22 06.5	112.4	21 44.7	113.4	21 22.4	114.4	21 00.1	115.4	20 37.2	116.4	10
4 00	24 21.2	113.3	23 58.4	114.4	23 35.2	115.4	23 11.6	116.4	22 47.6	117.4	4 00
3 50	26 34.8	114.3	26 11.0	115.4	25 46.7	116.4	25 21.9	117.5	24 56.7	118.5	3 50
40	28 47.4	115.5	28 22.5	116.5	27 57.0	117.5	27 31.0	118.6	27 04.6	119.6	40
30	30 58.7	116.7	30 32.7	117.7	30 05.8	118.7	29 38.6	119.8	29 11.0	120.8	30
20	33 08.7	117.9	32 41.2	119.0	32 13.2	120.0	31 44.8	121.1	31 15.8	122.1	20
10	35 17.0	119.3	34 48.3	120.4	34 18.9	121.4	33 49.0	122.5	33 18.7	123.5	10
3 00	37 23.6	120.7	36 53.5	121.8	36 22.6	122.8	35 51.4	123.9	35 19.5	125.0	3 00
2 50	39 28.2	122.3	38 56.6	123.4	38 24.3	124.4	37 51.4	125.5	37 18.1	126.6	2 50
40	41 30.6	124.0	40 57.5	125.1	40 23.6	126.2	39 49.2	127.3	39 14.1	128.3	40
30	43 30.5	125.8	42 55.6	126.9	42 20.4	128.0	41 44.0	129.1	41 07.2	130.2	30
20	45 27.5	127.8	44 50.9	129.0	44 13.7	130.1	43 35.8	131.1	42 57.4	132.2	20
10	47 21.2	130.0	46 42.8	131.1	46 03.7	132.2	45 24.1	133.3	44 43.7	134.4	10
2 00	49 11.2	132.4	48 31.0	133.5	47 50.0	134.6	47 08.4	135.7	46 26.3	136.7	2 00
1 50	50 57.0	134.9	50 14.7	136.0	49 31.7	137.1	48 48.3	138.2	48 04.1	139.2	1 50
40	52 38.0	137.7	51 53.7	138.8	51 08.6	139.9	50 23.1	140.9	49 37.1	141.9	40
30	54 13.4	140.8	53 26.9	141.9	52 39.9	142.9	51 52.3	143.9	51 04.2	144.8	30
20	55 42.5	144.1	54 54.0	145.1	54 04.8	146.1	53 15.2	147.1	52 25.2	148.0	20
10	57 04.5	147.7	56 13.7	148.7	55 22.6	149.6	54 30.9	150.5	53 38.9	151.3	10
1 00	58 18.4	151.6	57 25.6	152.5	56 32.5	153.3	55 38.9	154.1	54 45.2	154.9	1 00
0 50	59 23.3	155.8	58 28.5	156.6	57 33.4	157.3	56 38.3	158.0	55 42.6	158.7	0 50
40	60 18.1	160.2	59 21.7	160.9	58 24.9	161.5	57 28.1	162.1	56 31.2	162.7	40
30	61 01.9	164.9	60 04.0	165.4	59 05.9	165.9	58 07.7	166.4	57 09.4	166.9	30
20	61 34.0	169.8	60 35.0	170.2	59 35.8	170.5	58 36.6	170.8	57 37.4	171.2	20
10	61 53.5	174.9	60 53.7	175.1	59 53.9	175.2	58 54.1	175.4	57 54.3	175.6	10
0 00	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 09.8	110.6									5 40
30	2 26.4	111.2	2 11.1	112.1	1 55.7	113.1	1 40.2	114.1	1 24.8	115.1	30
20	4 42.4	111.8	4 26.1	112.7	4 09.8	113.7	3 53.5	114.7	3 37.0	115.7	20
10	6 57.8	112.5	6 40.7	113.4	6 23.3	114.4	6 05.9	115.3	5 48.4	116.3	10
5 00	9 12.5	113.2	8 54.4	114.1	8 36.0	115.1	8 17.7	116.0	7 59.0	117.0	5 00
4 50	11 26.6	113.9	11 07.3	114.8	10 48.1	115.8	10 28.6	116.8	10 08.8	117.7	4 50
40	13 39.8	114.7	13 19.6	115.6	12 59.2	116.6	12 38.6	117.6	12 17.7	118.5	40
30	15 52.2	115.5	15 31.0	116.5	15 09.4	117.4	14 47.6	118.4	14 25.7	119.4	30
20	18 03.6	116.4	17 41.2	117.4	17 18.6	118.3	16 55.6	119.3	16 32.4	120.3	20
10	20 14.0	117.4	19 50.5	118.4	19 26.6	119.3	19 02.5	120.3	18 38.0	121.2	10
4 00	22 23.2	118.4	21 58.5	119.3	21 33.5	120.3	21 08.2	121.3	20 42.3	122.2	4 00
3 50	24 31.2	119.5	24 05.3	120.4	23 39.0	121.4	23 12.3	122.4	22 45.2	123.3	3 50
40	26 37.8	120.6	26 10.6	121.6	25 43.0	122.6	25 15.0	123.5	24 46.5	124.5	40
30	28 42.9	121.8	28 14.3	122.8	27 45.3	123.8	27 15.9	124.8	26 46.1	125.8	30
20	30 46.2	123.1	30 16.3	124.1	29 45.9	125.1	29 15.1	126.1	28 43.7	127.1	20
10	32 47.7	124.5	32 16.4	125.5	31 44.3	126.5	31 12.2	127.5	30 39.3	128.5	10
3 00	34 47.1	126.0	34 14.1	127.0	33 40.8	128.0	33 06.9	129.0	32 32.5	130.0	3 00
2 50	36 44.1	127.6	36 09.7	128.6	35 34.7	129.6	34 59.2	130.6	34 23.2	131.6	2 50
40	38 38.5	129.4	38 02.4	130.4	37 25.8	131.4	36 48.8	132.4	36 11.0	133.3	40
30	40 30.3	131.2	39 52.2	132.2	39 14.0	133.2	38 35.1	134.2	37 55.8	135.2	30
20	42 18.3	133.2	41 38.7	134.2	40 58.8	135.2	40 18.2	136.2	39 37.0	137.2	20
10	44 03.0	135.4	43 21.6	136.4	42 39.7	137.4	41 57.4	138.3	41 14.5	139.3	10
2 00	45 43.5	137.7	45 00.3	138.7	44 16.6	139.7	43 32.4	140.6	42 47.7	141.5	2 00
1 50	47 19.6	140.2	46 34.4	141.2	45 48.8	142.1	45 02.7	143.0	44 16.3	143.9	1 50
40	48 50.4	142.9	48 03.4	143.8	47 16.0	144.7	46 28.1	145.6	45 39.7	146.5	40
30	50 15.9	145.8	49 26.7	146.7	48 37.5	147.5	47 47.7	148.4	46 57.6	149.2	30
20	51 34.5	148.9	50 43.8	149.7	49 52.6	150.5	49 01.3	151.3	48 09.3	152.1	20
10	52 46.7	152.2	51 54.0	153.0	51 01.1	153.7	50 07.7	154.4	49 14.3	155.1	10
1 00	53 50.9	155.7	52 56.6	156.4	52 02.0	157.1	51 07.3	157.7	50 12.1	158.3	1 00
0 50	54 47.1	159.4	53 51.0	160.0	52 55.0	160.6	51 58.6	161.1	51 02.1	161.7	0 50
40	55 33.8	163.2	54 36.5	163.7	53 39.1	164.2	52 41.6	164.7	51 43.9	165.2	40
30	56 11.1	167.3	55 12.5	167.6	54 14.0	167.9	53 15.7	168.3	52 16.9	168.7	30
20	56 38.1	171.4	55 38.8	171.7	54 39.5	172.0	53 40.2	172.2	52 40.7	172.4	20
10	56 54.5	175.7	55 54.7	175.8	54 54.9	176.0	53 55.0	176.1	52 55.1	176.2	10
0 00	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 14.6	89.0	0 29.1	88.1	0 43.6	87.1	0 58.0	86.1	6 00
5 50	2 25.6	90.6	2 40.1	89.6	2 54.4	88.7	3 08.9	87.7	3 23.3	86.7	5 50
40	4 51.1	91.2	5 05.7	90.2	5 20.0	89.3	5 34.3	88.3	5 48.6	87.3	40
30	7 16.6	91.8	7 31.1	90.9	7 45.5	89.9	7 59.9	88.9	8 14.0	87.9	30
20	9 42.0	92.5	9 56.7	91.5	10 11.1	90.5	10 25.4	89.5	10 39.6	88.5	20
10	12 07.4	93.1	12 22.2	92.1	12 36.6	91.1	12 51.0	90.1	13 05.1	89.1	10
5 00	14 32.6	93.7	14 47.6	92.7	15 02.1	91.7	15 16.5	90.7	15 30.6	89.7	5 00
4 50	16 57.8	94.4	17 12.9	93.3	17 27.5	92.3	17 42.0	91.3	17 56.1	90.3	4 50
40	19 22.9	95.0	19 38.2	94.0	19 52.9	93.0	20 07.4	92.0	20 21.7	90.9	40
30	21 47.8	95.7	22 03.2	94.7	22 18.2	93.6	22 33.0	92.6	22 47.1	91.5	30
20	24 12.5	96.4	24 28.3	95.4	24 43.4	94.3	24 58.2	93.2	25 12.7	92.2	20
10	26 37.0	97.2	26 53.0	96.1	27 08.5	95.0	27 23.5	93.9	27 38.0	92.8	10
4 00	29 01.3	98.0	29 17.7	96.9	29 33.4	95.8	29 48.6	94.6	30 03.4	93.5	4 00
3 50	31 25.2	98.8	31 42.0	97.6	31 58.2	96.5	32 13.8	95.4	32 28.5	94.2	3 50
40	33 49.0	99.6	34 06.2	98.4	34 22.6	97.3	34 38.4	96.1	34 53.7	95.0	40
30	36 12.4	100.5	36 29.9	99.3	36 46.8	98.2	37 03.2	96.9	37 18.6	95.7	30
20	38 35.2	101.5	38 53.4	100.2	39 10.7	99.0	39 27.4	97.8	39 43.3	96.5	20
10	40 57.6	102.5	41 16.3	101.2	41 34.3	100.0	41 51.4	98.7	42 07.8	97.4	10
3 00	43 19.4	103.6	43 38.9	102.3	43 57.4	101.0	44 15.2	99.7	44 32.0	98.3	3 00
2 50	45 40.4	104.8	46 00.7	103.4	46 20.1	102.1	46 38.7	100.7	46 55.7	99.3	2 50
40	48 00.7	106.1	48 21.9	104.7	48 42.1	103.3	49 01.1	101.8	49 19.3	100.4	40
30	50 20.0	107.4	50 42.2	106.0	51 03.4	104.6	51 23.4	103.1	51 42.0	101.5	30
20	52 38.3	109.1	53 01.7	107.5	53 23.7	106.0	53 44.6	104.4	54 04.5	102.8	20
10	54 55.1	110.8	55 19.6	109.2	55 43.0	107.6	56 05.2	105.9	56 25.9	104.2	10
2 00	57 10.3	112.7	57 36.5	111.1	58 01.1	109.4	58 24.5	107.6	58 46.5	105.8	2 00
1 50	59 23.4	114.9	59 51.5	113.2	60 17.6	111.4	60 42.5	109.5	61 05.9	107.6	1 50
40	61 34.1	117.4	62 03.9	115.6	62 32.0	113.7	62 58.7	111.7	63 23.9	109.7	40
30	63 41.5	120.3	64 13.6	118.4	64 43.9	116.4	65 12.8	114.3	65 39.6	112.2	30
20	65 45.1	123.6	66 19.8	121.6	66 52.5	119.5	67 23.7	117.3	67 53.3	115.0	20
10	67 43.5	127.5	68 21.0	125.4	68 57.0	123.2	69 30.9	120.9	70 03.0	118.5	10
1 00	69 35.5	132.1	70 16.4	129.9	70 55.5	127.7	71 33.0	125.2	72 08.9	122.7	1 00
0 50	71 18.9	137.5	72 03.5	135.3	72 46.6	133.1	73 28.0	130.6	74 07.2	127.9	0 50
40	72 51.2	143.9	73 39.9	141.9	74 27.2	139.7	75 13.0	137.2	75 57.5	134.5	40
30	74 09.2	151.4	75 01.8	149.7	75 53.5	147.6	76 44.0	145.4	77 33.5	142.8	30
20	75 09.0	160.1	76 05.5	158.8	77 01.4	157.2	77 56.6	155.4	78 51.3	153.3	20
10	75 47.0	169.8	76 46.0	169.0	77 44.9	168.1	78 43.6	167.1	79 41.9	165.3	10
0 00	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 12.5	85.1	1 27.0	84.2	1 41.4	83.2	1 55.8	82.2	2 10.2	81.3	6 00
5 50	3 37.6	85.7	3 51.9	84.8	4 06.0	83.8	4 20.1	82.8	4 34.1	81.8	5 50
40	6 02.8	86.3	6 16.8	85.4	6 30.7	84.4	6 44.6	83.4	6 58.2	82.4	40
30	8 28.1	86.9	8 41.9	85.9	8 55.6	85.0	9 09.2	84.0	9 22.6	83.0	30
20	10 53.4	87.5	11 07.1	86.5	11 20.7	85.5	11 34.0	84.5	11 47.1	83.5	20
10	13 18.9	88.1	13 32.5	87.1	13 45.9	86.1	13 59.0	85.1	14 11.9	84.1	10
5 00	15 44.4	88.7	15 57.9	87.7	16 11.1	86.6	16 24.0	85.6	16 36.7	84.6	5 00
4 50	18 09.9	89.3	18 23.3	88.3	18 36.4	87.2	18 49.3	86.2	19 01.7	85.2	4 50
40	20 35.4	89.9	20 48.9	88.8	21 01.8	87.8	21 14.5	86.7	21 26.7	85.7	40
30	23 00.9	90.5	23 14.4	89.4	23 27.3	88.3	23 39.9	87.2	23 52.0	86.2	30
20	25 26.5	91.1	25 39.9	90.0	25 52.8	88.9	26 05.2	87.8	26 17.2	86.7	20
10	27 52.0	91.7	28 05.4	90.6	28 18.3	89.5	28 30.7	88.4	28 42.6	87.3	10
4 00	30 17.4	92.4	30 31.0	91.3	30 43.8	90.1	30 56.2	89.0	31 07.9	87.9	4 00
3 50	32 42.8	93.1	32 56.5	91.9	33 09.4	90.7	33 21.7	89.6	33 33.5	88.4	3 50
40	35 08.3	93.8	35 21.9	92.6	35 34.9	91.4	35 47.3	90.2	35 58.9	89.0	40
30	37 33.2	94.5	37 47.2	93.3	38 00.4	92.0	38 12.8	90.8	38 24.6	89.5	30
20	39 58.3	95.3	40 12.6	94.0	40 25.8	92.7	40 38.3	91.4	40 49.9	90.1	20
10	42 23.2	96.1	42 37.6	94.8	42 51.2	93.4	43 03.9	92.1	43 15.5	90.7	10
3 00	44 47.7	97.0	45 02.6	95.6	45 16.4	94.2	45 29.2	92.8	45 41.0	91.4	3 00
2 50	47 12.1	97.9	47 27.2	96.5	47 41.4	95.0	47 54.5	93.6	48 06.6	92.1	2 50
40	49 36.1	98.9	49 51.8	97.4	50 06.3	95.9	50 19.6	94.4	50 31.9	92.8	40
30	51 59.6	100.0	52 16.0	98.4	52 31.0	96.8	52 44.8	95.2	52 57.3	93.6	30
20	54 22.8	101.2	54 39.8	99.5	54 55.3	97.8	55 09.6	96.2	55 22.4	94.4	20
10	56 45.1	102.4	57 02.9	100.8	57 19.4	99.0	57 34.2	97.2	57 47.5	95.4	10
2 00	59 06.9	104.0	59 25.7	102.1	59 42.8	100.3	59 58.4	98.3	60 12.2	96.4	2 00
1 50	61 27.5	105.7	61 47.5	103.7	62 05.8	101.7	62 22.2	99.6	62 36.8	97.4	1 50
40	63 47.1	107.6	64 08.5	105.5	64 27.7	103.3	64 45.3	101.1	65 00.7	98.8	40
30	66 04.8	109.9	66 27.8	107.6	66 49.0	105.3	67 07.8	102.8	67 24.2	100.3	30
20	68 20.5	112.6	68 45.6	110.1	69 08.4	107.6	69 29.0	104.9	69 47.0	102.1	20
10	70 33.0	115.9	71 00.9	113.2	71 26.0	110.4	71 49.0	107.4	72 08.8	104.4	10
1 00	72 42.0	119.9	73 13.0	117.0	73 41.0	113.9	74 06.5	110.6	74 28.6	107.2	1 00
0 50	74 44.8	124.9	75 19.5	121.8	75 51.8	118.4	76 20.8	114.8	76 46.5	110.9	0 50
40	76 39.3	131.5	77 19.2	128.1	77 59.5	124.4	78 29.9	120.4	79 00.2	116.0	40
30	78 21.0	139.9	79 06.8	136.6	79 50.0	132.8	80 30.4	128.4	81 07.0	123.4	30
20	79 44.6	150.8	80 36.3	147.9	81 26.7	144.4	82 14.8	140.2	82 59.9	135.1	20
10	80 40.3	164.5	81 37.8	102.7	82 34.9	160.4	83 31.1	157.5	84 26.0	153.6	10
0 00	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 01.2	79.7	0 15.9	78.7	0 30.7	77.8	0 45.4	76.8	1 00.1	75.8	6 10
6 00	2 24.5	80.3	2 38.8	79.3	2 53.0	78.4	3 07.2	77.4	3 21.3	76.4	6 00
5 50	4 48.1	80.9	5 01.9	79.9	5 15.7	78.9	5 29.4	77.9	5 43.0	77.0	5 50
40	7 11.8	81.4	7 25.2	80.5	7 38.6	79.5	7 51.9	78.5	8 04.9	77.5	40
30	9 35.9	82.0	9 48.9	81.0	10 01.9	80.0	10 14.6	79.0	10 27.2	78.0	30
20	12 00.1	82.5	12 12.8	81.5	12 25.3	80.5	12 37.6	79.5	12 49.6	78.5	20
10	14 24.6	83.1	14 36.8	82.1	14 49.1	81.0	15 00.9	80.0	15 12.4	79.0	10
5 00	16 49.0	83.6	17 01.1	82.6	17 12.8	81.6	17 24.3	80.5	17 35.3	79.5	5 00
4 50	19 13.7	84.1	19 25.4	83.1	19 37.0	82.0	19 47.9	81.0	19 58.6	79.9	4 50
40	21 38.5	84.6	21 50.0	83.6	22 01.1	82.5	22 11.8	81.5	22 22.0	80.4	40
30	24 03.6	85.1	24 14.7	84.1	24 25.6	83.0	24 35.7	81.9	24 45.6	80.8	30
20	26 28.6	85.7	26 39.5	84.6	26 50.0	83.5	27 00.0	82.3	27 09.3	81.2	20
10	28 53.9	86.2	29 04.5	85.1	29 14.8	83.9	29 24.3	82.9	29 33.3	81.7	10
4 00	31 19.0	86.7	31 29.6	85.6	31 39.4	84.4	31 48.7	83.2	31 57.3	82.1	4 00
3 50	33 44.4	87.2	33 54.8	86.0	34 04.4	84.8	34 13.3	83.6	34 21.6	82.5	3 50
40	36 09.8	87.8	36 19.9	86.5	36 29.3	85.3	36 38.1	84.1	36 45.9	82.8	40
30	38 35.3	88.3	38 45.3	87.0	38 54.6	85.7	39 02.8	84.5	39 10.4	83.2	30
20	41 00.7	88.8	41 10.6	87.5	41 19.7	86.2	41 27.8	84.9	41 35.0	83.6	20
10	43 26.4	89.4	43 36.0	88.0	43 45.0	86.7	43 52.7	85.3	43 59.7	83.9	10
3 00	45 51.8	90.0	46 01.5	88.6	46 10.2	87.2	46 17.9	85.7	46 24.4	84.3	3 00
2 50	48 17.4	90.6	48 27.0	89.1	48 35.7	87.6	48 43.0	86.1	48 49.3	84.6	2 50
40	50 42.9	91.3	50 52.6	89.7	51 01.0	88.1	51 08.4	86.5	51 14.1	85.0	40
30	53 08.5	92.0	53 18.0	90.3	53 26.7	88.6	53 33.6	87.0	53 39.3	85.3	30
20	55 33.8	92.7	55 43.6	91.0	55 52.0	89.2	55 59.0	87.4	56 04.3	85.7	20
10	57 59.2	93.5	58 09.1	91.6	58 17.6	89.8	58 24.4	87.9	58 29.5	86.0	10
2 00	60 24.3	94.4	60 34.6	92.4	60 43.1	90.4	60 49.9	88.3	60 54.7	86.3	2 00
1 50	62 49.4	95.4	63 00.0	93.2	63 08.8	91.0	63 15.3	88.8	63 20.0	86.6	1 50
40	65 14.0	96.5	65 25.3	94.1	65 34.2	91.8	65 41.1	89.4	65 45.2	86.9	40
30	67 38.5	97.8	67 50.2	95.2	67 59.8	92.6	68 06.3	89.9	68 10.6	87.2	30
20	70 02.5	99.3	70 15.2	96.4	70 25.0	93.5	70 32.1	90.5	70 35.9	87.6	20
10	72 25.7	101.2	72 39.5	97.9	72 50.2	94.6	72 57.3	91.3	73 01.5	87.9	10
1 00	74 47.8	103.6	75 03.3	99.8	75 15.1	96.1	75 23.2	92.1	75 26.8	88.2	1 00
0 50	77 08.5	106.8	77 26.0	102.4	77 39.5	97.8	77 48.0	93.2	77 52.3	88.5	0 50
40	79 25.8	111.1	79 47.1	106.0	80 03.1	100.4	80 13.4	94.7	80 17.8	88.8	40
30	81 38.5	117.8	82 05.5	111.4	82 25.5	104.4	82 38.5	96.9	82 43.0	89.1	30
20	83 40.9	128.7	84 16.2	121.0	84 44.0	111.7	85 02.2	101.0	85 08.9	89.4	20
10	85 18.7	148.3	86 08.0	140.6	86 51.0	129.1	87 22.4	112.1	87 34.4	89.7	10
0 00	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	1 14.7	74.9	1 29.5	73.9	1 44.0	72.9	1 58.7	72.0	2 13.2	71.0	6 10
6 00	3 35.4	75.4	3 49.4	74.5	4 03.4	73.5	4 17.2	72.5	4 31.0	71.5	6 00
5 50	5 56.4	76.0	6 09.9	75.0	6 23.1	74.0	6 36.3	73.0	6 49.4	72.1	5 50
40	8 17.9	76.5	8 30.5	75.5	8 43.2	74.5	8 55.6	73.6	9 07.9	72.6	40
30	10 39.5	77.0	10 51.7	76.0	11 03.6	75.0	11 15.4	74.0	11 27.0	73.0	30
20	13 01.5	77.5	13 13.0	76.5	13 24.4	75.5	13 35.5	74.5	13 46.3	73.5	20
10	15 23.7	78.0	15 34.8	77.0	15 45.4	76.0	15 55.9	74.9	16 06.2	73.9	10
5 00	17 46.2	78.4	17 56.6	77.4	18 06.8	76.4	18 16.6	75.3	18 26.0	74.3	5 00
4 50	20 08.9	78.9	20 18.9	77.8	20 28.3	76.8	20 37.5	75.7	20 46.3	74.7	4 50
40	22 31.8	79.3	22 41.1	78.2	22 50.1	77.2	22 58.6	76.1	23 06.7	75.0	40
30	24 54.9	79.7	25 03.8	78.6	25 12.1	77.6	25 20.1	76.5	25 27.5	75.3	30
20	27 18.2	80.1	27 26.5	79.0	27 34.4	77.9	27 41.6	76.8	27 48.4	75.7	20
10	29 41.6	80.5	29 49.6	79.4	29 56.7	78.2	30 03.4	77.1	30 09.4	75.9	10
4 00	32 05.4	80.9	32 12.6	79.7	32 19.3	78.5	32 25.4	77.4	32 30.7	76.2	4 00
3 50	34 29.1	81.2	34 36.0	80.0	34 42.0	78.8	34 47.4	77.6	34 52.2	76.4	3 50
40	36 53.1	81.6	36 59.3	80.3	37 04.9	79.1	37 09.7	77.8	37 13.7	76.6	40
30	39 17.0	81.9	39 22.9	80.6	39 27.9	79.3	39 32.0	78.0	39 35.3	76.8	30
20	41 41.3	82.2	41 46.5	80.9	41 50.9	79.6	41 54.4	78.2	41 56.9	76.9	20
10	44 05.5	82.5	44 10.3	81.1	44 14.1	79.8	44 16.9	78.3	44 18.7	77.0	10
3 00	46 29.9	82.8	46 34.1	81.4	46 37.4	79.9	46 39.5	78.5	46 40.5	77.0	3 00
2 50	48 54.2	83.1	48 58.1	81.6	49 00.7	80.1	49 02.1	78.5	49 02.3	77.0	2 50
40	51 18.9	83.4	51 22.1	81.8	51 24.1	80.2	51 24.8	78.6	51 24.2	77.0	40
30	53 43.4	83.6	53 46.3	81.9	53 47.4	80.2	53 47.5	78.5	53 46.0	76.9	30
20	56 08.1	83.8	56 10.3	82.1	56 10.9	80.3	56 10.1	78.5	56 07.6	76.7	20
10	58 32.7	84.1	58 34.5	82.1	58 34.4	80.2	58 32.6	78.3	58 29.2	76.4	10
2 00	60 57.7	84.2	60 58.6	82.2	60 57.8	80.1	60 55.2	78.1	60 50.5	76.0	2 00
1 50	63 22.4	84.4	63 22.7	82.2	63 21.1	79.9	63 17.5	77.7	63 11.6	75.5	1 50
40	65 47.5	84.5	65 46.9	82.1	65 44.5	79.6	65 39.5	77.2	65 32.2	74.8	40
30	68 12.1	84.6	68 11.3	81.9	68 07.5	79.2	68 01.0	76.5	67 52.5	73.9	30
20	70 37.2	84.5	70 35.0	81.5	70 30.4	78.6	70 22.7	75.6	70 11.7	72.7	20
10	73 01.7	84.4	72 59.2	81.0	72 52.5	77.6	72 43.2	74.3	72 30.2	71.0	10
1 00	75 27.0	84.2	75 22.5	80.2	75 14.5	76.3	75 02.7	72.5	74 46.6	68.8	1 00
0 50	77 51.3	83.7	77 46.0	79.0	77 35.5	74.4	77 20.5	69.9	77 01.0	65.7	0 50
40	80 16.1	82.9	80 08.2	77.0	79 54.6	71.4	79 35.6	66.1	79 11.3	61.1	40
30	82 40.0	81.2	82 29.5	73.6	82 10.5	66.5	81 45.0	60.0	81 15.0	54.2	30
20	85 03.4	77.7	84 46.3	66.9	84 19.4	57.4	83 44.8	49.6	83 04.4	43.1	20
10	87 22.9	67.2	86 51.9	50.1	86 09.2	38.4	85 20.0	30.7	84 27.3	25.3	10
0 00	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 11.2	69.4	0 26.6	68.5	0 42.0	67.5	0 57.3	66.5	1 12.7	65.5	6 20
10	2 27.7	70.0	2 42.3	69.0	2 56.7	68.1	3 11.2	67.1	3 25.5	66.1	10
6 00	4 44.8	70.6	4 58.4	69.6	5 12.0	68.6	5 25.5	67.8	5 38.9	66.6	6 00
5 50	7 02.2	71.1	7 15.1	70.1	7 27.7	69.1	7 40.2	68.1	7 52.7	67.1	5 50
40	9 20.1	71.6	9 32.1	70.6	9 43.9	69.6	9 55.5	68.6	10 07.0	67.6	40
30	11 38.3	72.0	11 49.6	71.0	12 00.3	70.0	12 11.2	69.0	12 21.7	68.0	30
20	13 57.0	72.5	14 07.3	71.4	14 17.5	70.4	14 27.3	69.4	14 37.0	68.4	20
10	16 15.9	72.9	16 25.6	71.8	16 34.7	70.8	16 43.7	69.8	16 52.3	68.7	10
5 00	18 35.2	73.3	18 43.9	72.2	18 52.4	71.2	19 00.5	70.1	19 08.2	69.1	5 00
4 50	20 54.7	73.6	21 02.6	72.6	21 10.2	71.5	21 17.5	70.4	21 24.2	69.4	4 50
40	23 14.4	74.0	23 21.6	72.9	23 28.4	71.8	23 34.7	70.7	23 40.6	69.6	40
30	25 34.3	74.2	25 40.8	73.1	25 46.7	72.0	25 52.1	70.9	25 57.1	69.8	30
20	27 54.5	74.5	28 00.2	73.4	28 05.3	72.3	28 09.8	71.1	28 13.8	70.0	20
10	30 14.8	74.8	30 19.8	73.6	30 23.9	72.5	30 27.6	71.3	30 30.7	70.2	10
4 00	32 35.4	75.0	32 39.4	73.8	32 42.9	72.6	32 45.6	71.4	32 47.7	70.3	4 00
3 50	34 56.1	75.2	34 59.3	74.0	35 01.7	72.7	35 03.6	71.5	35 04.6	70.3	3 50
40	37 16.8	75.3	37 19.2	74.1	37 20.9	72.8	37 21.6	71.6	37 21.7	70.3	40
30	39 37.7	75.4	39 39.2	74.1	39 39.8	72.8	39 39.7	71.5	39 38.7	70.2	30
20	41 58.6	75.5	41 59.2	74.2	41 59.0	72.9	41 57.7	71.5	41 55.6	70.2	20
10	44 19.6	75.6	44 19.3	74.2	44 18.0	72.8	44 15.7	71.4	44 12.5	70.0	10
3 00	46 40.5	75.6	46 39.2	74.1	46 37.0	72.7	46 33.6	71.2	46 29.1	69.7	3 00
2 50	49 01.4	75.5	48 59.2	74.0	48 55.7	72.5	48 51.2	70.9	48 45.4	69.4	2 50
40	51 22.2	75.4	51 19.0	73.8	51 14.5	72.2	51 08.7	70.6	51 01.5	69.0	40
30	53 43.0	75.2	53 38.6	73.5	53 32.8	71.8	53 25.6	70.1	53 17.1	68.4	30
20	56 03.6	74.9	55 58.1	73.1	55 51.0	71.3	55 42.4	69.6	55 32.4	67.8	20
10	58 24.0	74.5	58 17.1	72.6	58 08.5	70.7	57 58.3	68.8	57 46.7	67.0	10
2 00	60 44.0	74.0	60 35.8	72.0	60 25.7	69.9	60 13.9	67.9	60 00.2	66.0	2 00
1 50	63 03.7	73.3	62 53.7	71.1	62 41.8	69.0	62 28.1	66.8	62 12.5	64.7	1 50
40	65 22.8	72.4	65 11.0	70.1	64 57.4	67.8	64 41.5	65.5	64 23.5	63.3	40
30	67 41.2	71.3	67 27.2	68.7	67 11.2	66.2	66 52.7	63.8	66 32.5	61.4	30
20	69 58.4	69.8	69 42.3	67.0	69 23.7	64.3	69 02.4	61.7	68 38.9	59.1	20
10	72 14.2	67.8	71 55.2	64.8	71 33.2	61.8	71 09.0	58.9	70 41.5	56.2	10
1 00	74 27.7	65.2	74 05.2	61.8	73 39.9	58.5	73 11.4	55.5	72 40.4	52.5	1 00
0 50	76 37.7	61.5	76 11.0	57.8	75 41.0	54.2	75 07.7	50.9	74 32.0	47.8	0 50
40	78 43.1	56.5	78 10.7	52.3	77 34.9	48.4	76 56.2	45.9	76 15.1	41.8	40
30	80 38.5	49.0	79 59.5	44.6	79 17.0	40.6	78 31.5	37.2	77 44.7	34.2	30
20	82 19.7	37.9	81 32.0	33.5	80 41.6	30.0	79 49.8	27.0	78 56.5	24.5	20
10	83 32.5	21.4	82 36.3	18.4	81 39.3	16.2	80 41.6	14.4	79 43.5	12.9	10
0 00	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	80 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 25.6	90.6	2 11.1	91.6	1 56.4	92.6	1 41.8	93.5	1 27.2	94.5	5 50
40	4 51.1	91.2	4 36.5	92.2	4 21.7	93.2	4 06.9	94.1	3 52.2	95.1	40
30	7 16.6	91.8	7 01.8	92.8	6 47.0	93.8	6 32.1	94.7	6 17.1	95.7	30
20	9 42.0	92.5	9 27.2	93.4	9 12.1	94.4	8 57.0	95.4	8 41.8	96.4	20
10	12 07.4	93.1	11 52.5	94.0	11 37.2	95.0	11 22.0	96.0	11 06.4	97.0	10
5 00	14 32.6	93.7	14 17.6	94.7	14 02.1	95.7	13 46.5	96.7	13 30.8	97.7	5 00
4 50	16 57.8	94.4	16 42.6	95.4	16 26.9	96.4	16 11.0	97.4	15 54.9	98.4	4 50
40	19 22.9	95.0	19 07.4	96.1	18 51.4	97.1	18 35.1	98.1	18 18.7	99.1	40
30	21 47.8	95.7	21 32.0	96.8	21 15.8	97.8	20 59.2	98.8	20 42.2	99.8	30
20	24 12.5	96.4	23 56.5	97.5	23 39.7	98.5	23 22.8	99.6	23 05.5	100.6	20
10	26 37.0	97.2	26 20.7	98.3	26 03.6	99.3	25 46.2	100.4	25 28.3	101.4	10
4 00	29 01.3	98.0	28 44.5	99.1	28 27.0	100.1	28 09.1	101.2	27 50.9	102.3	4 00
3 50	31 25.2	98.8	31 08.0	99.9	30 50.2	101.0	30 31.8	102.1	30 12.8	103.2	3 50
40	33 49.0	99.6	33 31.3	100.8	33 12.7	101.9	32 53.6	103.0	32 34.2	104.2	40
30	36 12.4	100.5	35 53.9	101.7	35 35.0	102.9	35 15.3	104.0	34 55.0	105.2	30
20	38 35.2	101.5	38 16.3	102.7	37 56.5	103.9	37 36.1	105.1	37 15.1	106.3	20
10	40 57.6	102.5	40 37.9	103.7	40 17.5	105.0	39 56.2	106.2	39 34.4	107.4	10
3 00	43 19.4	103.6	42 59.0	104.9	42 37.6	106.2	42 15.6	107.4	41 52.8	108.7	3 00
2 50	45 40.4	104.8	45 19.2	106.1	44 57.1	107.4	44 33.9	108.7	44 10.1	110.0	2 50
40	48 00.7	106.1	47 38.6	107.5	47 15.3	108.8	46 51.1	110.2	46 26.3	111.5	40
30	50 20.0	107.4	49 56.8	109.0	49 32.5	110.4	49 07.2	111.8	48 40.8	113.1	30
20	52 38.3	109.1	52 13.9	110.6	51 48.1	112.0	51 21.4	113.5	50 53.9	114.9	20
10	54 55.1	110.8	54 29.2	112.4	54 02.1	113.9	53 34.1	115.4	53 04.9	116.8	10
2 00	57 10.3	112.7	56 43.0	114.4	56 14.1	116.0	55 44.3	117.5	55 13.5	119.0	2 00
1 50	59 23.4	114.9	58 54.2	116.6	58 23.9	118.3	57 52.0	119.9	57 19.2	121.5	1 50
40	61 34.1	117.4	61 03.0	119.2	60 30.2	120.9	59 56.4	122.6	59 21.6	124.2	40
30	63 41.5	120.3	63 08.6	122.1	62 33.2	123.9	61 57.0	125.6	61 19.6	127.3	30
20	65 45.1	123.6	65 09.2	125.5	64 31.4	127.4	63 52.6	129.1	63 12.9	130.8	20
10	67 43.5	127.5	67 04.5	129.4	66 24.1	131.3	65 42.2	133.1	64 59.6	134.8	10
1 00	69 35.5	132.1	68 53.2	134.0	68 09.4	135.9	67 24.5	137.7	66 39.0	139.4	1 00
0 50	71 18.9	137.5	70 33.0	139.4	69 45.9	141.3	68 57.8	143.0	68 08.5	144.6	0 50
40	72 51.2	143.9	72 01.5	145.7	71 10.7	147.5	70 19.0	149.0	69 27.0	150.4	40
30	74 09.2	151.4	73 15.5	153.0	72 21.4	154.5	71 26.5	155.8	70 31.5	157.0	30
20	75 09.0	160.1	74 12.2	161.3	73 15.0	162.4	72 17.4	163.4	71 19.8	164.3	20
10	75 47.0	169.8	74 47.9	170.4	73 48.6	171.0	72 49.3	171.5	71 49.8	172.0	10
0 00	76 0.0	180.0	75 0.0	180.0	74 0.0	180.0	73 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 12.6	95.5	0 57.9	96.4	0 43.1	97.4	0 28.3	98.4	0 13.6	99.3	5 50
40	3 37.3	96.1	3 22.3	97.1	3 07.2	98.0	2 52.2	99.0	2 37.1	100.0	40
30	6 02.0	96.7	5 46.7	97.7	5 31.3	98.6	5 15.6	99.6	5 00.3	100.6	30
20	8 26.3	97.4	8 10.8	98.3	7 55.0	99.3	7 39.2	100.3	7 23.1	101.3	20
10	10 50.7	98.0	10 34.8	99.0	10 18.6	100.0	10 02.3	100.9	9 45.8	101.9	10
5 00	13 14.6	98.7	12 58.3	99.7	12 41.7	100.7	12 24.9	101.6	12 08.0	102.6	5 00
4 50	15 38.4	99.4	15 21.7	100.4	15 04.6	101.4	14 47.4	102.4	14 29.9	103.4	4 50
40	18 01.8	100.1	17 44.6	101.1	17 27.1	102.1	17 09.3	103.1	16 51.1	104.1	40
30	20 24.9	100.9	20 07.3	101.9	19 49.2	102.9	19 30.9	103.9	19 12.2	104.9	30
20	22 47.6	101.7	22 29.4	102.7	22 10.8	103.7	21 51.8	104.8	21 32.5	105.8	20
10	25 10.0	102.5	24 51.2	103.5	24 31.9	104.6	24 12.3	105.7	23 52.3	106.7	10
4 00	27 31.8	103.4	27 12.4	104.4	26 52.4	105.5	26 32.1	106.6	26 11.3	107.6	4 00
3 50	29 53.2	104.3	29 32.8	105.4	29 12.4	106.5	28 51.3	107.6	28 29.7	108.6	3 50
40	32 13.8	105.3	31 53.0	106.4	31 31.6	107.5	31 09.7	108.6	30 47.1	109.7	40
30	34 34.0	106.3	34 12.4	107.5	33 50.1	108.6	33 27.3	109.7	33 03.8	110.8	30
20	36 53.2	107.4	36 30.8	108.6	36 07.7	109.7	35 43.7	110.9	35 19.2	112.0	20
10	39 11.7	108.6	38 48.2	109.8	38 24.1	110.9	37 59.2	112.1	37 33.6	113.3	10
3 00	41 29.0	109.9	41 04.5	111.1	40 39.2	112.3	40 13.3	113.5	39 46.6	114.7	3 00
2 50	43 45.3	111.3	43 19.8	112.5	42 53.3	113.8	42 26.0	115.0	41 58.1	116.2	2 50
40	46 00.2	112.8	45 33.3	114.1	45 05.6	115.4	44 37.1	116.6	44 07.8	117.8	40
30	48 13.6	114.5	47 45.4	115.8	47 16.3	117.1	46 46.2	118.3	46 15.5	119.6	30
20	50 25.2	116.3	49 55.4	117.6	49 24.7	119.0	48 53.1	120.3	48 20.8	121.6	20
10	52 34.5	118.3	52 03.2	119.7	51 30.9	121.1	50 57.6	122.4	50 23.5	123.7	10
2 00	54 41.4	120.5	54 08.2	121.9	53 34.0	123.3	52 58.9	124.7	52 22.9	126.0	2 00
1 50	56 45.1	123.0	56 10.1	124.4	55 33.9	125.8	54 56.8	127.2	54 18.8	128.6	1 50
40	58 45.4	125.7	58 08.1	127.2	57 29.5	128.7	56 50.4	130.1	56 10.3	131.4	40
30	60 41.1	128.9	60 01.5	130.4	59 20.9	131.9	58 39.3	133.3	57 56.7	134.6	30
20	62 31.6	132.4	61 49.4	133.9	61 06.1	135.4	60 22.2	136.8	59 37.3	138.1	20
10	64 15.6	136.4	63 30.8	137.9	62 44.9	139.3	61 58.3	140.7	61 10.9	142.0	10
1 00	65 51.9	140.9	65 04.2	142.4	64 15.4	143.7	63 26.2	145.0	62 36.1	146.2	1 00
0 50	67 18.5	146.0	66 28.0	147.5	65 36.5	148.7	64 44.7	149.9	63 52.0	151.0	0 50
40	68 33.9	151.7	67 40.4	153.0	66 46.3	154.0	65 51.8	155.1	64 56.9	156.1	40
30	69 35.5	158.1	68 39.6	159.1	67 43.2	160.0	66 46.5	160.9	65 49.5	161.7	30
20	70 21.8	165.0	69 23.6	165.7	68 25.3	166.4	67 26.7	167.0	66 28.1	167.6	20
10	70 50.4	172.4	69 50.9	172.8	68 51.3	173.1	68 51.7	173.4	66 52.7	173.7	10
0 00	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 21.9	100.9	2 06.7	101.9	1 51.4	102.9	1 36.2	103.8	1 20.9	104.8	5 40
30	4 44.7	101.5	4 29.0	102.5	4 13.2	103.5	3 57.3	104.4	3 41.4	105.4	30
20	7 07.1	102.2	6 50.9	103.2	6 34.5	104.2	6 18.1	105.1	6 01.5	106.1	20
10	9 29.2	102.9	9 12.4	103.9	8 55.5	104.9	8 38.4	105.8	8 21.1	106.8	10
5 00	11 50.8	103.4	11 33.4	104.6	11 15.8	105.6	10 58.1	106.5	10 40.1	107.5	5 00
4 50	14 12.1	104.4	13 54.1	105.3	13 35.9	106.3	13 17.4	107.3	12 58.7	108.3	4 50
40	16 32.8	105.1	16 14.1	106.1	15 55.2	107.1	15 36.1	108.1	15 16.6	109.1	40
30	18 53.1	105.9	18 33.7	106.9	18 14.2	107.9	17 54.1	108.9	17 33.8	109.9	30
20	21 12.7	106.8	20 52.6	107.8	20 32.2	108.8	20 11.4	109.8	19 50.3	110.8	20
10	23 31.8	107.7	23 10.8	108.7	22 49.6	109.7	22 27.9	110.7	22 05.8	111.7	10
4 00	25 50.0	108.6	25 28.3	109.7	25 06.2	110.7	24 43.6	111.7	24 20.6	112.7	4 00
3 50	28 07.5	109.6	27 44.9	110.7	27 21.9	111.7	26 58.3	112.8	26 34.3	113.8	3 50
40	30 24.1	110.7	30 00.6	111.8	29 36.5	112.8	29 12.0	113.9	28 46.9	114.9	40
30	32 39.8	111.9	32 15.2	113.0	31 50.2	114.0	31 24.4	115.1	30 58.3	116.1	30
20	34 54.3	113.1	34 28.6	114.2	34 02.3	115.3	33 35.6	116.4	33 08.3	117.4	20
10	37 07.5	114.4	36 40.6	115.5	36 13.4	116.6	35 45.3	117.7	35 16.6	118.8	10
3 00	39 19.3	115.8	38 51.2	117.0	38 22.5	118.1	37 53.2	119.2	37 23.2	120.3	3 00
2 50	41 29.5	117.4	41 00.0	118.6	40 30.1	119.7	39 59.7	120.8	39 27.9	121.9	2 50
40	43 37.8	119.0	43 06.9	120.2	42 35.3	121.4	42 03.3	122.5	41 30.3	123.6	40
30	45 44.0	120.8	45 11.5	122.0	44 38.5	123.2	44 04.7	124.3	43 30.3	125.5	30
20	47 47.7	122.8	47 13.6	124.0	46 38.8	125.2	46 03.5	126.3	45 27.3	127.5	20
10	49 48.6	124.9	49 12.8	126.2	48 36.2	127.4	47 58.9	128.5	47 21.0	129.7	10
2 00	51 46.2	127.3	51 08.5	128.5	50 30.0	129.7	49 51.0	130.9	49 11.1	132.1	2 00
1 50	53 39.9	129.9	53 00.2	131.2	52 19.9	132.4	51 38.7	133.6	50 56.9	134.7	1 50
40	55 29.3	132.7	54 47.6	134.0	54 04.9	135.2	53 21.9	136.4	52 37.9	137.5	40
30	57 13.5	135.9	56 29.5	137.1	55 44.9	138.3	54 59.3	139.5	54 13.3	140.6	30
20	58 51.8	139.4	58 05.3	140.6	57 18.2	141.7	56 30.8	142.9	55 42.4	143.9	20
10	60 22.8	143.2	59 34.0	144.4	58 44.8	145.5	57 54.7	146.6	57 04.5	147.6	10
1 00	61 45.7	147.4	60 54.5	148.5	60 02.9	149.5	59 11.0	150.5	58 18.3	151.5	1 00
0 50	62 59.2	152.0	62 05.7	153.0	61 12.0	153.9	60 17.6	154.8	59 23.1	155.7	0 50
40	64 01.8	157.0	63 06.2	157.9	62 10.4	158.7	61 14.5	159.4	60 18.0	160.1	40
30	64 52.4	162.4	63 55.0	163.1	62 57.6	163.7	61 59.7	164.3	61 01.9	164.8	30
20	65 29.5	168.1	64 30.7	168.5	63 31.9	169.0	62 33.1	169.4	61 34.0	169.8	20
10	65 52.5	174.0	64 52.7	174.2	63 53.0	174.5	62 53.2	174.7	61 53.4	174.9	10
0 00	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 05.6	105.8	0 50.2	106.7	0 34.9	107.7	0 19.5	108.7	0 04.1	109.6	5 40
30	3 25.5	106.4	3 09.4	107.3	2 53.3	108.3	2 37.1	109.3	2 21.0	110.2	30
20	5 44.9	107.1	5 28.0	108.0	5 11.2	109.0	4 54.2	110.0	4 37.2	110.9	20
10	8 03.7	107.8	7 46.2	108.7	7 28.5	109.7	7 10.7	110.7	6 53.0	111.6	10
5 00	10 22.1	108.5	10 03.7	109.4	9 45.3	110.4	9 26.7	111.4	9 07.8	112.3	5 00
4 50	12 39.9	109.3	12 20.7	110.2	12 01.3	111.2	11 41.7	112.2	11 22.2	113.1	4 50
40	14 56.9	110.1	14 36.9	111.0	14 16.7	112.0	13 56.2	113.0	13 35.5	113.9	40
30	17 13.3	110.9	16 52.3	111.9	16 31.2	112.9	16 09.8	113.8	15 48.2	114.8	30
20	19 28.8	111.8	19 07.0	112.8	18 44.9	113.8	18 22.5	114.7	17 59.8	115.7	20
10	21 43.4	112.8	21 20.7	113.8	20 57.6	114.8	20 34.2	115.7	20 10.4	116.7	10
4 00	23 57.3	113.8	23 33.5	114.8	23 09.3	115.8	22 44.8	116.7	22 19.8	117.7	4 00
3 50	26 09.9	114.9	25 45.1	115.9	25 19.7	116.9	24 54.1	117.8	24 28.1	118.8	3 50
40	28 21.5	116.0	27 55.4	117.0	27 29.0	118.0	27 02.2	119.0	26 34.8	120.0	40
30	30 31.6	117.2	30 04.3	118.2	29 36.7	119.2	29 08.6	120.3	28 40.2	121.3	30
20	32 40.4	118.5	32 11.9	119.5	31 43.0	120.5	31 13.5	121.6	30 43.6	122.6	20
10	34 47.4	119.9	34 17.7	120.9	33 47.3	121.9	33 16.5	123.0	32 45.3	124.0	10
3 00	36 52.8	121.4	36 21.5	122.4	35 49.8	123.5	35 17.6	124.5	34 44.8	125.5	3 00
2 50	38 55.8	123.0	38 23.2	124.1	37 50.1	125.2	37 16.3	126.2	36 42.1	127.2	2 50
40	40 56.9	124.7	40 22.6	125.8	39 47.9	126.9	39 12.6	127.9	38 36.7	129.0	40
30	42 55.0	126.6	42 19.3	127.7	41 42.7	128.8	41 05.9	129.8	40 28.4	130.8	30
20	44 50.4	128.6	44 12.8	129.7	43 34.7	130.8	42 56.1	131.8	42 16.8	132.9	20
10	46 42.4	130.8	46 03.0	131.9	45 23.1	133.0	44 42.6	134.0	44 01.6	135.1	10
2 00	48 30.5	133.2	47 49.3	134.3	47 07.6	135.4	46 25.3	136.4	45 42.3	137.4	2 00
1 50	50 14.4	135.8	49 31.1	136.9	48 47.5	137.9	48 03.3	138.9	47 18.5	139.9	1 50
40	51 53.4	138.6	51 08.1	139.7	50 22.5	140.7	49 36.3	141.7	48 49.5	142.6	40
30	53 26.6	141.6	52 39.4	142.7	51 51.7	143.7	51 03.5	144.6	50 15.0	145.5	30
20	54 53.8	144.9	54 04.4	145.9	53 14.8	146.9	52 24.7	147.8	51 34.0	148.6	20
10	56 13.6	148.5	55 22.3	149.4	54 30.5	150.3	53 38.6	151.2	52 46.2	152.0	10
1 00	57 25.6	152.3	56 32.2	153.2	55 38.7	154.0	54 44.9	154.8	53 50.5	155.5	1 00
0 50	58 28.4	156.4	57 33.3	157.2	56 38.1	157.9	55 42.5	158.6	54 46.6	159.2	0 50
40	59 21.7	160.8	58 24.8	161.4	57 28.0	162.0	56 31.0	162.6	55 33.7	163.1	40
30	60 04.0	165.4	59 05.8	165.9	58 07.7	166.3	57 09.3	166.8	56 11.1	167.2	30
20	60 35.0	170.2	59 35.8	170.5	58 36.6	170.8	57 37.4	171.1	56 38.0	171.4	20
10	60 53.7	175.1	59 53.9	175.2	58 54.1	175.3	57 54.3	175.5	56 54.5	175.7	10
0 00	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	2 04.7	111.2	1 48.5	112.2	1 32.1	113.1	1 15.8	114.1	0 59.6	115.1	5 30
20	4 20.1	111.9	4 02.9	112.9	3 45.7	113.8	3 28.4	114.8	3 11.0	115.7	20
10	6 34.8	112.1	6 16.8	113.6	5 58.5	114.5	5 40.2	115.5	5 21.7	116.4	10
5 00	8 48.9	113.3	8 29.7	114.3	8 10.6	115.2	7 51.2	116.2	7 31.7	117.1	5 00
4 50	11 02.2	114.1	10 42.1	115.1	10 21.8	116.0	10 01.4	117.0	9 40.8	117.9	4 50
40	13 14.6	114.9	12 53.5	115.9	12 32.3	116.8	12 10.7	117.8	11 49.0	118.7	40
30	15 26.2	115.8	15 04.2	116.8	14 41.7	117.7	14 18.9	118.7	13 56.1	119.6	30
20	17 36.8	116.7	17 13.5	117.7	16 50.0	118.6	16 26.2	119.6	16 02.0	120.5	20
10	19 46.2	117.7	19 21.9	118.7	18 57.1	119.6	18 32.2	120.6	18 06.8	121.5	10
4 00	21 54.6	118.7	21 28.9	119.7	21 03.1	120.6	20 36.8	121.6	20 10.3	122.6	4 00
3 50	24 01.6	119.8	23 34.8	120.8	23 07.6	121.7	22 40.1	122.7	22 12.2	123.7	3 50
40	26 07.1	121.0	25 39.0	122.0	25 10.5	123.0	24 41.6	123.9	24 12.4	124.9	40
30	28 11.1	122.3	27 41.7	123.3	27 11.7	124.3	26 41.6	125.2	26 11.0	126.2	30
20	30 13.3	123.6	29 42.4	124.6	29 11.2	125.6	28 39.5	126.5	28 07.4	127.5	20
10	32 13.6	125.1	31 41.4	126.1	31 08.6	127.1	30 35.4	128.0	30 01.9	129.0	10
3 00	34 11.6	126.6	33 37.8	127.6	33 03.6	128.6	32 28.9	129.5	31 53.8	130.5	3 00
2 50	36 07.2	128.2	35 31.9	129.2	34 56.2	130.2	34 19.9	131.2	33 43.2	132.2	2 50
40	38 00.3	130.0	37 23.3	130.9	36 45.9	131.9	36 08.1	132.9	35 29.7	133.9	40
30	39 50.2	131.8	39 11.7	132.8	38 32.7	133.8	37 53.0	134.8	37 13.0	135.8	30
20	41 37.0	133.9	40 56.7	134.9	40 15.9	135.8	39 34.6	136.8	38 52.9	137.7	20
10	43 20.0	136.1	42 38.0	137.1	41 55.3	138.0	41 12.3	139.0	40 28.9	139.9	10
2 00	44 58.9	138.4	44 14.9	139.3	43 30.6	140.3	42 45.9	141.2	42 00.6	142.1	2 00
1 50	46 33.2	140.9	45 47.5	141.8	45 01.2	142.7	44 14.7	143.6	43 27.7	144.5	1 50
40	48 02.4	143.6	47 14.7	144.5	46 26.8	145.3	45 38.4	146.2	44 49.6	147.0	40
30	49 26.0	146.5	48 36.5	147.4	47 46.6	148.2	46 56.4	149.0	46 05.0	149.7	30
20	50 43.1	149.5	49 51.8	150.3	49 00.4	151.1	48 08.4	151.9	47 16.2	152.6	20
10	51 53.5	152.8	51 00.5	153.5	50 07.1	154.2	49 13.7	154.9	48 19.7	155.6	10
1 00	52 56.2	156.2	52 01.5	156.9	51 06.7	157.5	50 11.7	158.2	49 16.3	158.8	1 00
0 50	53 50.7	159.8	52 54.5	160.4	51 58.2	161.0	51 01.7	161.5	50 05.1	162.1	0 50
40	54 36.4	163.6	53 38.9	164.1	52 41.3	164.6	51 43.6	165.0	50 45.9	165.5	40
30	55 12.3	167.6	54 14.0	168.0	53 15.3	168.3	52 16.6	168.6	51 18.0	168.9	30
20	55 38.8	171.7	54 39.4	171.9	53 40.1	172.2	52 40.7	172.4	51 41.3	172.6	20
10	55 54.7	175.8	54 54.8	175.9	53 55.0	176.1	52 55.3	176.2	51 55.3	176.3	10
0 00	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 15.5	89.0	0 31.0	88.1	0 46.6	87.1	1 02.1	86.1	6 00
5 50	2 24.9	90.6	2 40.4	89.7	2 55.8	88.7	3 11.4	87.7	3 26.7	86.8	5 50
40	4 49.8	91.3	5 05.3	90.3	5 20.7	89.4	5 36.1	88.4	5 51.4	87.4	40
30	7 14.6	92.0	7 30.4	91.0	7 45.9	90.0	8 01.1	89.0	8 16.2	88.0	30
20	9 39.4	92.6	9 55.0	91.6	10 10.5	90.7	10 25.9	89.7	10 41.0	88.7	20
10	12 04.0	93.3	12 19.9	92.3	12 35.3	91.3	12 50.8	90.3	13 05.9	89.3	10
5 00	14 28.7	94.0	14 44.6	93.0	15 00.2	92.0	15 15.6	91.0	15 30.7	90.0	5 00
4 50	16 53.1	94.7	17 09.2	93.7	17 24.9	92.7	17 40.5	91.6	17 55.6	90.6	4 50
40	19 17.4	95.4	19 33.8	94.4	19 49.7	93.3	20 05.3	92.3	20 20.5	91.3	40
30	21 41.6	96.1	21 58.2	95.1	22 14.2	94.0	22 30.0	93.0	22 45.5	91.9	30
20	24 05.6	96.9	24 22.4	95.8	24 38.7	94.8	24 54.7	93.7	25 10.1	92.6	20
10	26 29.3	97.7	26 46.5	96.6	27 03.0	95.5	27 19.1	94.4	27 34.8	93.3	10
4 00	28 52.7	98.5	29 10.2	97.4	29 27.1	96.3	29 43.5	95.2	29 59.3	94.1	4 00
3 50	31 15.9	99.4	31 33.8	98.2	31 51.0	97.1	32 07.8	96.0	32 23.8	94.9	3 50
40	33 38.6	100.3	33 57.0	99.1	34 14.7	98.0	34 31.7	96.8	34 48.1	95.7	40
30	36 01.0	101.2	36 19.9	100.1	36 37.9	98.9	36 55.5	97.7	37 12.2	96.5	30
20	38 22.8	102.3	38 42.3	101.1	39 01.0	99.8	39 18.9	98.6	39 36.0	97.3	20
10	40 44.2	103.4	41 04.2	102.1	41 23.5	100.8	41 41.9	99.6	41 59.5	98.3	10
3 00	43 04.8	104.5	43 25.6	103.2	43 45.6	101.9	44 04.6	100.6	44 22.7	99.3	3 00
2 50	45 24.6	105.7	45 46.2	104.4	46 06.9	103.1	46 26.8	101.7	46 45.5	100.4	2 50
40	47 43.6	107.1	48 06.3	105.8	48 27.9	104.4	48 48.4	102.9	49 07.8	101.5	40
30	50 01.5	108.6	50 25.1	107.2	50 47.6	105.8	51 09.0	104.3	51 29.4	102.8	30
20	52 18.1	110.3	52 42.9	108.8	53 06.6	107.3	53 29.2	105.7	53 50.4	104.1	20
10	54 33.2	112.1	54 59.5	110.6	55 24.2	109.0	55 48.0	107.3	56 10.4	105.7	10
2 00	56 46.5	114.1	57 14.2	112.5	57 40.6	110.9	58 05.7	109.1	58 29.3	107.4	2 00
1 50	58 57.4	116.4	59 27.0	114.7	59 54.9	113.0	60 21.5	111.2	60 46.8	109.3	1 50
40	61 05.7	119.0	61 37.2	117.2	62 07.3	115.4	62 35.7	113.5	63 02.5	111.6	40
30	63 10.6	122.0	63 44.2	120.2	64 16.5	118.2	64 47.1	116.2	65 16.1	114.1	30
20	65 11.2	125.4	65 47.4	123.5	66 22.3	121.5	66 55.4	119.4	67 26.7	117.2	20
10	67 06.2	129.4	67 45.5	127.4	68 23.1	125.3	68 59.2	123.1	69 33.5	120.8	10
1 00	68 54.6	134.0	69 37.0	132.0	70 18.1	129.8	70 57.6	127.6	71 35.1	125.2	1 00
0 50	70 34.0	139.4	71 20.0	137.5	72 04.8	135.3	72 48.0	133.0	73 29.5	130.5	0 50
40	72 02.1	145.7	72 52.1	143.9	73 40.8	141.9	74 28.4	139.6	75 14.1	137.2	40
30	73 16.8	153.0	74 09.8	151.4	75 02.2	149.7	75 54.0	147.6	76 45.0	145.4	30
20	74 12.5	161.3	75 09.4	160.1	76 05.8	158.8	77 01.9	157.2	77 56.9	155.4	20
10	74 47.9	170.4	75 47.0	169.8	76 46.1	169.0	77 45.0	168.1	78 43.6	167.2	10
0 00	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	1 17.6	85.2	1 33.0	84.2	1 48.4	83.2	2 03.8	82.3	2 19.2	81.3	6 00
5 50	3 42.0	85.8	3 57.2	84.8	4 12.4	83.9	4 27.6	82.9	4 42.6	81.9	5 50
40	6 06.6	86.4	6 21.6	85.5	6 36.6	84.5	6 51.4	83.5	7 06.1	82.6	40
30	8 31.4	87.1	8 46.2	86.1	9 00.9	85.1	9 15.5	84.1	9 29.9	82.2	30
20	10 56.0	87.7	11 10.6	86.7	11 25.2	85.7	11 39.6	84.7	11 53.8	83.7	20
10	13 20.8	88.3	13 35.4	87.3	13 49.8	86.3	14 04.0	85.3	14 18.0	84.3	10
5 00	15 45.6	89.0	16 00.2	88.0	16 14.5	86.9	16 28.4	85.9	16 42.1	84.9	5 00
4 50	18 10.5	89.6	18 25.0	88.6	18 39.2	87.6	18 53.1	86.5	19 06.5	85.5	4 50
40	20 35.4	90.2	20 49.8	89.2	21 03.9	88.2	21 17.7	87.1	21 31.0	86.1	40
30	23 00.7	90.9	23 14.7	89.8	23 28.8	88.8	23 42.4	87.7	23 55.7	86.7	30
20	25 25.1	91.6	25 39.6	90.5	25 53.6	89.4	26 07.2	88.3	26 20.3	87.2	20
10	27 49.9	92.3	28 04.5	91.2	28 18.5	90.1	28 32.1	89.0	28 45.2	87.8	10
4 00	30 14.7	93.0	30 29.3	91.9	30 43.4	90.7	30 56.9	89.6	31 09.8	88.4	4 00
3 50	32 39.2	93.7	32 54.1	92.6	33 08.4	91.4	33 21.8	90.2	33 34.7	89.0	3 50
40	35 03.8	94.5	35 18.7	93.3	35 33.1	92.1	35 46.7	90.9	35 59.6	89.7	40
30	37 28.2	95.3	37 43.3	94.0	37 57.9	92.8	38 11.6	91.6	38 24.6	90.3	30
20	39 52.4	96.1	40 07.8	94.8	40 22.4	93.6	40 36.3	92.3	40 49.4	91.0	20
10	42 16.2	97.0	42 32.3	95.7	42 47.1	94.4	43 01.1	93.0	43 14.3	91.7	10
3 00	44 40.0	97.9	44 56.2	96.6	45 11.4	95.2	45 25.7	93.8	45 39.0	92.4	3 00
2 50	47 03.2	98.9	47 20.0	97.5	47 35.6	96.1	47 50.2	94.7	48 03.7	93.2	2 50
40	49 26.3	100.0	49 43.4	98.6	49 59.5	97.1	50 14.6	95.6	50 28.3	94.0	40
30	51 48.6	101.2	52 06.5	99.7	52 23.1	98.1	52 38.7	96.5	52 52.9	94.9	30
20	54 10.5	102.5	54 29.1	100.9	54 46.4	99.2	55 02.4	97.6	55 17.0	95.9	20
10	56 31.4	103.9	56 51.0	102.3	57 09.2	100.5	57 25.9	98.7	57 41.0	96.9	10
2 00	58 51.6	105.6	59 12.2	103.8	59 31.3	101.9	59 48.8	100.0	60 04.6	98.1	2 00
1 50	61 10.4	107.4	61 32.4	105.5	61 52.7	103.5	62 11.1	101.5	62 27.9	99.4	1 50
40	63 28.0	109.5	63 51.3	107.5	64 13.0	105.3	64 32.6	103.2	64 50.4	100.9	40
30	65 43.2	112.0	66 08.6	109.8	66 31.8	107.5	66 53.4	105.1	67 12.4	102.7	30
20	67 56.4	114.9	68 23.7	112.5	68 49.2	110.0	69 12.2	107.5	69 33.0	104.8	20
10	70 06.0	118.4	70 36.0	115.8	71 03.8	113.1	71 29.3	110.3	71 52.3	107.3	10
1 00	72 11.0	122.6	72 44.2	119.8	73 15.4	116.9	73 43.8	113.8	74 09.6	110.5	1 00
0 50	74 09.2	127.8	74 46.8	124.9	75 21.7	121.8	75 53.7	118.3	76 23.0	114.7	0 50
40	75 58.7	134.5	76 40.7	131.5	77 20.4	128.1	77 57.7	124.4	78 31.8	120.4	40
30	77 34.2	142.8	78 21.8	139.9	79 08.0	136.6	79 51.4	132.8	80 31.5	128.5	30
20	78 51.3	153.3	79 44.8	150.9	80 36.8	147.9	81 27.3	144.5	82 15.5	140.3	20
10	79 42.0	165.9	80 40.4	164.5	81 37.9	162.7	82 35.1	160.5	83 31.3	157.5	10
0 00	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 11.9	79.7	0 27.6	78.7	0 43.5	77.8	0 59.1	76.8	1 14.8	75.9	6 10
6 00	2 34.5	80.3	2 49.8	79.4	3 05.1	78.4	3 20.2	77.4	3 35.4	76.5	6 00
5 50	4 57.6	81.0	5 12.4	80.0	5 27.2	79.0	5 41.9	78.0	5 56.4	77.1	5 50
40	7 20.6	81.6	7 35.2	80.6	7 49.5	79.6	8 03.7	78.6	8 17.9	77.7	40
30	9 44.2	82.2	9 58.3	81.2	10 12.2	80.2	10 25.9	79.2	10 39.5	78.2	30
20	12 07.7	82.7	12 21.5	81.8	12 35.1	80.8	12 48.4	79.8	13 01.5	78.8	20
10	14 31.7	83.3	14 45.0	82.3	14 58.2	81.3	15 11.2	80.3	15 23.8	79.3	10
5 00	16 55.6	83.9	17 08.7	82.9	17 21.5	81.9	17 33.9	80.8	17 46.2	79.8	5 00
4 50	19 19.8	84.5	19 32.5	83.4	19 45.0	82.4	19 57.2	81.4	20 08.9	80.3	4 50
40	21 43.9	85.0	21 56.6	84.0	22 08.7	82.9	22 20.4	81.9	22 31.8	80.8	40
30	24 08.5	85.6	24 20.8	84.5	24 32.5	83.4	24 44.0	82.4	24 34.9	81.3	30
20	26 32.9	86.2	26 45.0	85.1	26 56.6	84.0	27 07.6	82.9	27 18.2	81.8	20
10	28 57.5	86.7	29 09.4	85.6	29 20.8	84.5	29 31.6	83.4	29 41.7	82.2	10
4 00	31 22.2	87.3	31 33.9	86.1	31 45.0	85.0	31 55.4	83.8	32 05.4	82.7	4 00
3 50	33 47.0	87.9	33 58.5	86.7	34 09.4	85.5	34 19.7	84.3	34 29.1	83.1	3 50
40	36 11.8	88.5	36 23.2	87.3	36 33.9	86.0	36 43.8	84.8	36 53.1	83.6	40
30	38 36.7	89.1	38 48.0	87.8	38 58.5	86.6	39 08.4	85.3	39 17.0	84.0	30
20	41 01.5	89.7	41 12.8	88.4	41 23.2	87.1	41 32.6	85.8	41 41.3	84.5	20
10	43 26.3	90.3	43 37.7	89.0	43 47.9	87.6	43 57.2	86.3	44 05.5	84.9	10
3 00	45 51.3	91.0	46 02.5	89.6	46 12.6	88.2	46 21.7	86.8	46 29.9	85.3	3 00
2 50	48 16.2	91.7	48 27.3	90.2	48 37.6	88.8	48 46.5	87.3	48 54.2	85.8	2 50
40	50 40.9	92.5	50 52.2	90.9	51 02.4	89.4	51 11.2	87.8	51 18.9	86.2	40
30	53 05.7	93.3	53 17.2	91.6	53 27.2	90.0	53 36.1	88.3	53 43.5	86.6	30
20	55 30.1	94.2	55 41.9	92.4	55 52.2	90.7	56 00.9	88.9	56 08.1	87.1	20
10	57 54.6	95.1	58 06.6	93.2	58 17.0	91.4	58 25.8	89.5	58 32.8	87.6	10
2 00	60 18.8	96.1	60 31.2	94.2	60 41.9	92.2	60 50.6	90.1	60 57.7	88.1	2 00
1 50	62 42.7	97.2	62 55.6	95.2	63 06.5	93.0	63 15.7	90.8	63 22.4	88.6	1 50
40	65 06.1	98.5	65 19.7	96.3	65 31.3	94.0	65 40.3	91.6	65 47.5	89.2	40
30	67 29.4	100.2	67 43.5	97.6	67 55.6	95.1	68 05.2	92.4	68 12.1	89.8	30
20	69 51.3	102.0	70 06.9	99.2	70 19.9	96.3	70 29.8	93.3	70 37.2	90.4	20
10	72 12.4	104.3	72 29.6	101.1	72 43.4	97.9	72 54.5	94.5	73 01.5	91.2	10
1 00	74 32.0	107.1	74 51.2	103.6	75 06.9	99.8	75 18.6	96.0	75 27.0	92.0	1 00
0 50	76 48.7	110.8	77 11.0	106.8	77 28.7	102.3	77 43.0	97.8	77 51.4	93.1	0 50
40	79 02.1	116.0	79 28.2	111.1	79 49.6	105.9	80 05.6	100.4	80 16.1	94.6	40
30	81 08.4	123.5	81 40.5	117.8	82 07.0	111.5	82 27.2	104.4	82 40.0	96.9	30
20	83 00.7	135.1	83 41.8	128.8	84 17.2	121.1	84 45.1	111.8	85 03.4	101.0	20
10	84 26.2	153.7	85 19.0	148.4	86 08.4	140.7	86 51.4	129.2	87 22.9	112.1	10
0 00	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 16.0	70.4	6 20
10	1 30.5	74.9	1 46.1	73.9	2 01.7	73.0	2 17.3	72.0	2 32.7	71.0	10
6 00	3 50.4	75.5	4 05.5	74.5	4 20.4	73.6	4 35.2	72.6	4 50.0	71.6	6 00
5 50	6 11.0	76.1	6 25.3	75.1	6 39.6	74.1	6 53.7	73.1	7 07.8	72.2	5 50
40	8 31.7	76.7	8 45.6	75.7	8 59.1	74.7	9 12.5	73.7	9 25 9	72.7	40
30	10 52.8	77.2	11 06.0	76.2	11 19.0	75.2	11 31.8	74.2	11 44.3	73.2	30
20	13 14.3	77.8	13 26.9	76.8	13 39.3	75.7	13 51.4	74.7	14 03 3	73 7	20
10	15 36.1	78.3	15 48.1	77.3	15 59.9	76.2	16 11.4	75.2	16 22.6	74.2	10
5 00	17 58.0	78.8	18 09.6	77.8	18 20.7	76.7	18 31.6	75.7	18 42.1	74.6	5 00
4 50	20 20.3	79.3	20 31.3	78.2	20 41.9	77.2	20 52.1	76.1	21 01.9	75.0	4 50
40	22 42.7	79.7	22 53.2	78.7	23 03.2	77.6	23 12.8	76.5	23 22.0	75.4	40
30	25 05.4	80.2	25 15.4	79.2	25 24.8	78.0	25 33.8	76.9	25 42.4	75.8	30
20	27 28.2	80.6	27 37.8	79.5	27 46.7	78.4	27 55.1	77.3	28 03.0	76.2	20
10	29 51.3	81.1	30 00.3	79.9	30 08.7	78.8	30 16.5	77.7	30 23.7	76.5	10
4 00	32 14.5	81.5	32 23.1	80.3	32 31.0	79.2	32 38.2	78.0	32 44.7	76.8	4 00
3 50	34 37.9	81.9	34 45.9	80.7	34 53.3	79.5	34 59.9	78.3	35 05.9	77.1	3 50
40	37 01.4	82.3	37 09.1	81.1	37 15.8	79.8	37 21.9	78.6	37 27.2	77.3	40
30	39 25.1	82.7	39 32.2	81.4	39 38.5	80.1	39 44.0	78.8	39 48.6	77.6	30
20	41 48.8	83.1	41 55.6	81.8	42 01.3	80.4	42 06.2	79.1	42 10.1	77.8	20
10	44 13.0	83.5	44 19.0	82.1	44 24.5	80.7	44 28.5	79.3	44 31.7	77.9	10
3 00	46 36.7	83.9	46 42.6	82.4	46 47.4	81.0	46 51.0	79.5	46 53.5	78.0	3 00
2 50	49 00.9	84.3	49 06.2	82.7	49 10.6	81.2	49 13.5	79.7	49 15.2	78.1	2 50
40	51 25.0	84.6	51 30.1	83.0	51 33.7	81.4	51 36.0	78.8	51 37.1	78.2	40
30	53 49.4	85.0	53 53.9	83.3	53 57.1	81.6	53 58.6	79.9	53 59.0	78.2	30
20	56 13.7	85.3	56 17.9	83.5	56 20.4	81.7	56 21.3	79.9	56 20.7	78.1	20
10	58 38.2	85.7	58 41.7	83.8	58 43.9	81.9	58 44.0	79.9	58 42.3	78.0	10
2 00	61 02.7	86.0	61 05.9	84.0	61 07.2	81.9	61 06.6	79.8	61 04.1	77.8	2 00
1 50	63 27.2	86.4	63 30.0	84.2	63 30.7	81.9	63 29.1	79.7	63 25.6	77.4	1 50
40	65 51.9	86.7	65 54.3	84.3	65 54.1	81.8	65 51.7	79.4	65 46.9	76.9	40
30	68 16.5	87.1	68 18.2	84.4	68 17.5	81.7	68 14.0	79.0	68 07.9	76.3	30
20	70 41.2	87.4	70 42.7	84.3	70 40.8	81.3	70 36.0	78.4	70 28.4	75.4	20
10	73 06.0	87.7	73 06.5	84.2	73 04.2	80.8	72 57.6	77.4	72 48.2	74.1	10
1 00	75 30.7	88.1	75 31.0	84.1	75 26.8	80.1	75 18.6	76.2	75 06.9	72.3	1 00
0 50	77 55.5	88.4	77 55.0	83.6	77 49.7	78.9	77 38.7	74.3	77 24.0	69.7	0 50
40	80 20.5	88.7	80 18.7	82.8	80 10.9	76.9	79 57.3	71.3	79 38.3	65.9	40
30	82 44.5	89.0	82 42.0	81.1	82 31.5	73.5	82 12.5	66.3	81 47.0	59.8	30
20	85 10.2	89.3	85 04.7	77.6	84 47.6	66.7	84 20.7	57.3	83 46.0	49.4	20
10	87 35.0	89.7	87 23.5	67.1	86 52.4	49.9	86 09.6	38.3	85 20.4	30.5	10
0 00	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 32.4	69.4	0 48.6	68.5	1 05.0	67.5	1 21.2	66.5	1 37.5	65.5	6 20
10	2 48.3	70.0	3 03.8	69.1	3 19.2	68.1	3 34.4	67.1	3 49.8	66.1	10
6 00	5 04.7	70.6	5 19.3	69.7	5 33.8	68.7	5 48.3	67.7	6 02.6	66.7	6 00
5 50	7 21.7	71.2	7 35.3	70.2	7 49.1	69.2	8 02.5	68.2	8 15.9	67.2	5 50
40	9 39.0	71.7	9 52.0	70.7	10 04.7	69.7	10 17.4	68.7	10 29.8	67.8	40
30	11 56.7	72.2	12 08.9	71.2	12 20.8	70.2	12 32.6	69.2	12 44.1	68.2	30
20	14 14.9	72.7	14 26.4	71.7	14 37.4	70.7	14 48.3	69.7	14 58.9	68.7	20
10	16 33.4	73.2	16 44.1	72.1	16 54.3	71.1	17 04.2	70.1	17 14.0	69.0	10
5 00	18 52.2	73.6	19 02.2	72.5	19 11.6	71.5	19 20.7	70.5	19 29.4	69.4	5 00
4 50	21 11.4	74.0	21 20.5	72.9	21 29.1	71.9	21 37.3	70.8	21 45.2	69.7	4 50
40	23 30.8	74.4	23 39.1	73.3	23 47.0	72.2	23 54.4	71.1	24 01.3	70.0	40
30	25 50.5	74.7	25 58.1	73.6	26 05.0	72.5	26 11.5	71.4	26 17.5	70.3	30
20	28 10.3	75.0	28 17.1	73.9	28 23.3	72.8	28 28.9	71.7	28 34.1	70.5	20
10	30 30.4	75.3	30 36.4	74.2	30 41.7	73.0	30 46.5	71.9	30 50.7	70.7	10
4 00	32 50.6	75.6	32 55.9	74.4	33 00.4	73.2	33 04.4	72.1	33 07.6	70.9	4 00
3 50	35 11.1	75.9	35 15.6	74.6	35 19.2	73.4	35 22.2	72.2	35 24.5	71.0	3 50
40	37 31.6	76.1	37 35.3	74.8	37 38.1	73.5	37 40.3	72.3	37 41.4	71.0	40
30	39 52.3	76.3	39 55.2	75.0	39 57.2	73.6	39 58.3	72.3	39 58.5	71.0	30
20	42 13.1	76.4	42 15.2	75.1	42 16.2	73.7	42 16.4	72.4	42 15.5	71.0	20
10	44 34.0	76.5	44 35.2	75.1	44 35.2	73.7	44 34.3	72.3	44 32.5	70.9	10
3 00	46 54.8	76.6	46 55.2	75.1	46 54.3	73.7	46 52.4	72.2	46 49.3	70.8	3 00
2 50	49 15.9	76.6	49 15.2	75.1	49 13.2	73.6	49 10.2	72.0	49 06.0	70.5	2 50
40	51 36.8	76.6	51 35.2	75.0	51 32.3	73.4	51 28.0	71.8	51 22.4	70.2	40
30	53 57.7	76.5	53 55.1	74.8	53 51.0	73.1	53 45.4	71.4	53 38.5	69.8	30
20	56 18.5	76.3	56 14.8	74.5	56 09.5	72.7	56 02.7	71.0	55 54.3	69.2	20
10	58 39.2	76.1	58 34.3	74.2	58 27.6	72.3	58 19.3	70.4	58 09.5	68.5	10
2 00	60 59.7	75.7	60 53.6	73.7	60 45.4	71.6	60 35.6	69.6	60 23.8	67.6	2 00
1 50	63 20.0	75.2	63 12.3	73.0	63 02.5	70.8	62 50.9	68.7	62 37.2	66.5	1 50
40	65 39.8	74.5	65 30.7	72.2	65 19.0	69.8	65 05.4	67.5	64 49.5	65.2	40
30	67 59.2	73.6	67 48.0	71.0	67 34.2	68.4	67 18.3	65.9	67 00.0	63.5	30
20	70 17.7	72.4	70 04.6	69.5	69 48.4	66.7	69 29.8	64.0	69 08.6	61.4	20
10	72 35.2	70.8	72 19.2	67.6	72 00.5	64.5	71 38.5	61.5	71 13.7	58.7	10
1 00	74 51.1	68.6	74 32.3	65.0	74 09.8	61.5	73 44.1	58.3	73 15.7	55.3	1 00
0 50	77 04.7	65.5	76 41.5	61.4	76 14.5	57.5	75 44.2	54.0	75 11.2	50.7	0 50
40	79 14.1	60.9	78 45.8	56.3	78 13.2	52.0	77 37.4	48.2	76 58.7	44.8	40
30	81 16.5	53.9	80 41.0	48.8	80 01.5	44.3	79 18.5	40.4	78 33.7	37.0	30
20	83 05.5	42.9	82 20.6	37.6	81 32.6	33.4	80 42.4	29.8	79 50.6	26.8	20
10	84 27.7	25.1	83 32.8	21.3	82 36.6	18.3	81 39.5	16.1	80 41.8	14.3	10
0 00	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	81 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 24. 9	90. 6	2 09. 4	91. 6	1 53. 7	92. 6	1 38. 2	93. 6	1 22. 4	94. 5	5 50
40	4 49. 8	91. 3	4 34. 1	92. 3	4 18. 4	93. 2	4 02. 6	94. 2	3 46. 8	95. 2	40
30	7 14. 6	92. 0	6 59. 1	93. 0	6 43. 1	93. 9	6 27. 3	94. 9	6 11. 1	95. 9	30
20	9 39. 4	92. 6	9 23. 5	93. 6	9 07. 5	94. 6	8 51. 4	95. 5	8 35. 0	96. 5	20
10	12 04. 0	93. 3	11 48. 2	94. 3	11 31. 9	95. 3	11 15. 6	96. 2	10 59. 0	97. 2	10
5 00	14 28. 7	94. 0	14 12. 5	95. 0	13 56. 1	96. 0	13 39. 5	96. 9	13 22. 6	97. 9	5 00
4 50	16 53. 1	94. 7	16 36. 8	95. 7	16 20. 1	96. 7	16 03. 2	97. 7	15 45. 9	98. 7	4 50
40	19 17. 4	95. 4	19 00. 8	96. 4	18 43. 8	97. 4	18 26. 6	98. 4	18 09. 0	99. 4	40
30	21 41. 6	96. 1	21 24. 9	97. 1	21 07. 4	98. 2	20 49. 8	99. 2	20 31. 8	100. 2	30
20	24 05. 6	96. 9	23 48. 3	97. 9	23 30. 7	99. 0	23 12. 7	100. 0	22 54. 1	101. 1	20
10	26 29. 3	97. 7	26 11. 8	98. 7	25 53. 6	99. 8	25 35. 2	100. 8	25 16. 2	101. 9	10
4 00	28 52. 7	98. 5	28 34. 7	99. 6	28 16. 2	100. 7	27 57. 2	101. 7	27 37. 6	102. 8	4 00
3 50	31 15. 9	99. 4	30 57. 4	100. 5	30 38. 4	101. 6	30 18. 9	102. 7	29 58. 8	103. 8	3 50
40	33 38. 6	100. 3	33 19. 7	101. 4	33 00. 0	102. 5	32 39. 9	103 7	32 19. 1	104. 8	40
30	36 01. 0	101. 2	35 41. 5	102. 4	35 21. 2	103. 6	35 00. 4	104. 7	34 38. 9	105. 8	30
20	38 22. 8	102. 3	38 02. 6	103. 5	37 41. 8	104. 7	37 20. 2	105. 8	36 57. 8	107. 0	20
10	40 44. 2	103. 4	40 23. 2	104. 6	40 01. 6	105. 8	39 39. 2	107. 0	39 15. 9	108. 2	10
3 00	43 04. 8	104. 5	42 43. 0	105. 8	42 20. 5	107. 1	41 57. 3	108. 3	41 33. 1	109. 5	3 00
2 50	45 24. 6	105. 7	45 02. 0	107. 1	44 38. 5	108. 4	44 14. 2	109. 7	43 49. 1	110. 9	2 50
40	47 43. 6	107. 1	47 20. 1	108. 5	46 55. 5	109. 9	46 30. 1	111. 2	46 03. 7	112. 5	40
30	50 01. 5	108. 6	49 36. 8	110. 1	49 11. 1	111. 5	48 44. 4	112. 8	48 16. 8	114. 2	30
20	52 18. 1	110. 3	51 52. 1	111. 8	51 25. 1	113. 2	50 57. 1	114. 6	50 28. 0	116. 0	20
10	54 33. 2	112. 1	54 05. 9	113. 7	53 37. 3	115. 2	53 07. 8	116. 6	52 37. 1	118. 0	10
2 00	56 46. 5	114. 1	56 17. 5	115. 7	55 47. 3	117. 3	55 16. 1	118. 8	54 43. 7	120. 3	2 00
1 50	58 57. 4	116. 4	58 26. 7	118. 1	57 54. 6	119. 7	57 21. 5	121. 3	56 47. 2	122. 8	1 50
40	61 05. 7	119. 0	60 33. 0	120. 8	59 58. 9	122. 4	59 23. 6	124. 0	58 47. 1	125. 6	40
30	63 10. 6	122. 0	62 35. 5	123. 8	61 59. 0	125. 5	61 21. 5	127. 1	60 42. 8	128. 7	30
20	65 11. 2	125. 4	64 33. 4	127. 3	63 54. 5	129. 0	63 14. 3	130. 7	62 32. 9	132. 3	20
10	67 06. 2	129. 4	66 25. 8	131. 3	65 43. 8	133. 0	65 00. 9	134. 7	64 16. 8	136. 3	10
1 00	68 54. 6	134. 0	68 10. 7	135. 9	67 25. 8	137. 6	66 39. 9	139. 3	65 52. 7	140. 8	1 00
0 50	70 34. 0	139. 4	69 46. 8	141. 3	68 58. 5	142. 8	68 09. 4	144. 5	67 19. 2	145. 9	0 50
40	72 02. 1	145. 7	71 11. 4	147. 4	70 19. 7	149. 0	69 27. 5	150. 4	68 34. 3	151. 7	40
30	73 16. 8	153. 0	72 21. 8	154. 5	71 27. 0	155. 8	70 31. 6	157. 0	69 36. 0	158. 1	30
20	74 12. 5	161. 3	73 15. 2	162. 4	72 17. 6	163. 4	71 20. 0	164. 2	70 21. 9	165. 0	20
10	74 47. 9	170. 4	73 48. 6	171. 0	72 49. 3	171. 5	71 49. 9	172. 0	70 50. 4	172. 4	10
0 00	75 0. 0	180. 0	74 0. 0	180. 0	73 0. 0	180. 0	72 0. 0	180. 0	71 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 06.8	95.5	0 51.1	96.4	0 35.3	97.4	0 19.6	98.4	0 03.9	99.3	5 50
40	3 30.9	96.1	3 14.9	97.1	2 58.9	98.1	2 42.8	99.0	2 26.7	100.0	40
30	5 55.1	96.8	5 38.8	97.8	5 22.2	98.8	5 05.8	99.7	4 49.3	100.7	30
20	8 18.7	97.5	8 02.0	98.5	7 45.2	99.5	7 28.4	100.4	7 11.5	101.4	20
10	10 42.2	98.2	10 25.2	99.2	10 08.2	100.2	9 50.8	101.1	9 33.4	102.1	10
5 00	13 05.5	98.9	12 48.1	99.9	12 30.5	100.9	12 12.7	101.9	11 54.8	102.8	5 00
4 50	15 28.5	99.6	15 10.7	100.6	14 52.6	101.6	14 34.4	102.6	14 15.8	103.6	4 50
40	17 51.1	100.4	17 32.8	101.4	17 14.3	102.4	16 55.5	103.4	16 36.4	104.4	40
30	20 13.4	101.2	19 54.7	102.3	19 35.6	103.3	19 16.2	104.3	18 56.5	105.3	30
20	22 35.3	102.1	22 16.0	103.1	21 56.3	104.1	21 36.3	105.1	21 16.0	106.2	20
10	24 56.8	103.0	24 36.9	104.0	24 16.6	105.1	23 55.9	106.1	23 34.8	107.1	10
4 00	27 17.7	103.9	26 57.2	104.9	26 36.2	106.0	26 14.7	107.0	25 52.9	108.0	4 00
3 50	29 38.1	104.9	29 16.9	105.9	28 55.3	107.0	28 33.0	108.1	28 10.3	109.1	3 50
40	31 57.8	105.9	31 35.8	107.0	31 13.3	108.1	30 50.2	109.1	30 26.7	110.2	40
30	34 16.8	107.0	33 54.0	108.1	33 30.7	109.2	33 06.8	110.3	32 42.3	111.4	30
20	36 35.0	108.1	36 11.2	109.3	35 46.9	110.4	35 22.0	111.5	34 56.6	112.6	20
10	38 52.1	109.3	38 27.6	110.6	38 02.2	111.7	37 36.3	112.8	37 09.7	114.0	10
3 00	41 08.2	110.7	40 42.5	111.9	40 16.1	113.1	39 49.0	114.3	39 21.3	115.4	3 00
2 50	43 23.1	112.2	42 56.2	113.4	42 28.6	114.6	42 00.3	115.8	41 31.2	117.0	2 50
40	45 36.5	113.8	45 08.3	115.0	44 39.4	116.2	44 09.8	117.5	43 39.4	118.7	40
30	47 48.2	115.5	47 18.8	116.8	46 48.5	118.0	46 17.4	119.3	45 45.5	120.5	30
20	49 58.1	117.3	49 27.1	118.7	48 55.1	119.9	48 22.5	121.2	47 49.1	122.5	20
10	52 05.5	119.4	51 32.9	120.8	50 59.4	122.1	50 25.0	123.4	49 49.7	124.7	10
2 00	54 10.3	121.7	53 35.9	123.1	53 00.5	124.4	52 24.3	125.8	51 47.3	127.0	2 00
1 50	56 12.0	124.3	55 35.5	125.7	54 58.3	127.0	54 20.0	128.4	53 40.9	129.7	1 50
40	58 09.8	127.1	57 31.2	128.5	56 51.7	129.9	56 11.2	131.2	55 30.1	132.5	40
30	59 03.0	130.2	59 22.1	131.7	58 40.3	133.1	57 57.7	134.4	57 14.3	135.7	30
20	61 50.7	133.8	61 07.2	135.2	60 23.1	136.6	59 37.9	137.9	58 52.3	139.2	20
10	63 31.9	137.8	62 45.8	139.2	61 58.9	140.6	61 11.4	141.9	60 23.2	143.1	10
1 00	65 05.0	142.3	64 16.1	143.6	63 26.7	144.9	62 36.6	146.2	61 46.1	147.3	1 00
0 50	66 28.2	147.3	65 37.1	148.6	64 45.0	149.8	63 52.4	150.9	62 59.4	151.9	0 50
40	67 40.8	152.9	66 46.7	154.0	65 52.0	155.1	64 57.2	156.0	64 02.0	156.9	40
30	68 39.8	159.1	67 43.2	160.0	66 46.7	160.8	65 49.7	161.6	64 52.5	162.3	30
20	69 23.8	165.7	68 25.3	166.4	67 26.8	167.0	66 28.2	167.5	65 29.6	168.0	20
10	69 50.9	172.7	68 51.3	173.1	67 51.7	173.4	66 52.1	173.7	65 52.5	174.0	10
0 00	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 10.5	101.0	1 54.3	101.9	1 38.1	102.9	1 21.8	103.8	1 05.6	104.8	5 40
30	4 32.6	101.6	4 15.9	102.6	3 59.2	103.6	3 42.3	104.5	3 25.5	105.5	30
20	6 54.3	102.3	6 37.1	103.3	6 19.8	104.3	6 02.4	105.2	5 44.9	106.2	20
10	9 15.8	103.1	8 57.9	104.0	8 40.1	105.0	8 22.0	105.9	8 03.8	106.9	10
5 00	11 36.6	103.8	11 18.2	104.7	10 59.7	105.7	10 40.9	106.7	10 22.1	107.7	5 00
4 50	13 57.1	104.6	13 38.2	105.5	13 18.9	106.5	12 59.5	107.5	12 39.9	108.5	4 50
40	16 17.0	105.4	15 57.4	106.4	15 37.5	107.4	15 17.3	108.3	14 56.9	109.3	40
30	18 36.5	106.3	18 16.2	107.2	17 55.4	108.2	17 34.4	109.2	17 13.2	110.2	30
20	20 55.2	107.2	20 34.1	108.2	20 12.7	109.2	19 50.9	110.2	19 28.8	111.1	20
10	23 13.3	108.1	22 51.4	109.1	22 29.2	110 1	22 06.5	111.1	21 43.5	112.1	10
4 00	25 30.6	109.1	25 07.9	110.1	24 44.8	111.1	24 21.2	112.1	23 57.3	113.2	4 00
3 50	27 47.2	110.2	27 23.5	111.2	26 59.4	112.2	26 34.8	113.2	26 09.9	114.3	3 50
40	30 02.6	111.3	29 38.0	112.3	29 13.0	113.4	28 47.4	114.4	28 21.5	115.4	40
30	32 17.1	112.5	31 51.6	113.5	31 25.4	114.6	30 58.5	115.6	30 31.6	116.7	30
20	34 30.4	113.7	34 03.7	114.8	33 36.5	115.9	33 08.7	116.9	32 40.4	118.0	20
10	36 42.4	115.1	36 14.6	116.2	35 46.1	117.3	35 17.0	118.3	34 47.4	119.4	10
3 00	38 52.8	116.5	38 23.7	117.7	37 53.9	118.8	37 23.6	119.9	36 52.8	121.0	3 00
2 50	41 01.5	118.1	40 31.1	119.3	40 00.1	120.4	39 28.1	121.5	38 55.9	122.6	2 50
40	43 08.2	119.8	42 36.4	121.0	42 03.8	122.1	41 30.6	123.2	40 56.9	124.3	40
30	45 12.7	121.7	44 39.5	122.9	44 05.3	124.0	43 30.5	125.2	42 55.1	126.3	30
20	47 14.7	123.7	46 39.7	124.9	46 04.0	126.0	45 27.5	127.2	44 50.4	128.3	20
10	49 13.7	125.9	48 37.0	127.1	47 59.4	128.3	47 21.1	129.4	46 42.4	130.5	10
2 00	51 09.4	128.3	50 30.7	129.5	49 51.4	130.7	49 11.2	131.8	48 30.5	132.9	2 00
1 50	53 01.0	131.0	52 20.4	132.1	51 39.0	133.3	50 57.0	134.4	50 14.4	135.5	1 50
40	54 48.2	133.8	54 05.5	134.9	53 22.2	136.1	52 38.0	137.3	51 53.4	138.4	40
30	56 30.2	136.9	55 45.2	138.1	54 59.5	139.3	54 13.4	140.4	53 26.6	141.4	30
20	58 05.8	140.4	57 18.6	141.6	56 31.0	142.7	55 42.5	143.8	54 53.8	144.8	20
10	59 34.3	144.2	58 45.0	145.3	57 54.9	146.4	57 04.5	147.4	56 13.6	148.4	10
1 00	60 54.8	148.4	60 03.2	149.4	59 11.1	150.4	58 18.4	151.3	57 25.6	152.2	1 00
0 50	62 05.9	152.9	61 12.1	153.8	60 17.8	154.7	59 23.2	155.5	58 28.4	156.3	0 50
40	63 06.4	157.8	62 10.5	158.8	61 14.5	159.3	60 18.1	160.0	59 21.7	160.7	40
30	63 55.0	163.0	62 57.7	163.6	61 59.8	164.2	61 01.9	164.8	60 04.0	165.3	30
20	64 30.8	168.5	63 31.9	168.9	62 33.0	169.4	61 34.0	169.7	60 35.0	170.1	20
10	64 52.7	174.2	63 53.0	174.4	62 53.2	174.6	61 53.5	174.8	60 53.6	175.0	10
0 00	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 49.2	105.8	0 33.0	106.7	0 16.6	107.7	0 00.2	108.7			5 40
30	3 08.4	106.5	2 51.4	107.4	2 34.3	108.4	2 17.3	109.3	2 00.2	110.3	30
20	5 27.2	107.2	5 09.5	108.1	4 51.6	109.1	4 33.7	110.0	4 15.8	111.0	20
10	7 45.4	107.9	7 26.9	108.8	7 08.3	109.8	6 49.7	110.7	6 30.7	111.7	10
5 00	10 02.9	108.6	9 43.7	109.6	9 24.3	110.6	9 04.7	111.5	8 45.0	112.5	5 00
4 50	12 19.9	109.4	11 59.9	110.4	11 39.5	111.4	11 19.1	112.3	10 58.5	113.3	4 50
40	14 36.2	110.3	14 15.3	111.3	13 54.1	112.2	13 32.7	113.2	13 11.1	114.2	40
30	16 51.7	111.2	16 29.9	112.2	16 07.7	113.1	15 45.5	114.1	15 22.9	115.1	30
20	19 06.3	112.1	18 43.7	113.1	18 20.6	114.0	17 57.2	115.0	17 33.6	116.0	20
10	21 20.1	113.1	20 56.4	114.1	20 32.3	115.1	20 08.1	116.1	20 56.7	117.0	10
4 00	23 32.9	114.1	23 08.2	115.1	22 43.1	116.1	22 17.6	117.1	21 51.8	118.1	4 00
3 50	25 44.8	115.3	25 18.7	116.3	24 52.4	117.3	24 25.9	118.2	23 58.9	119.2	3 50
40	27 54.9	116.4	27 28.1	117.5	27 00.6	118.5	26 32.8	119.4	26 04.7	120.4	40
30	30 04.0	117.7	29 35.2	118.7	29 07.2	119.7	28 38.3	120.7	28 08.7	121.7	30
20	32 11.5	119.0	31 42.1	120.1	31 12.2	121.1	30 41.9	122.1	30 11.1	123.1	20
10	34 17.5	120.5	33 46.5	121.5	33 15.3	122.5	32 43.0	123.5	32 11.5	124.5	10
3 00	36 21.1	122.0	35 49.1	123.1	35 16.5	124.1	34 43.3	125.1	34 09.7	126.1	3 00
2 50	38 22.9	123.6	37 49.4	124.7	37 15.4	125.7	36 40.7	126.8	36 05.6	127.8	2 50
40	40 22.3	125.4	39 47.3	126.5	39 11.6	127.5	38 35.4	128.6	37 58.7	129.6	40
30	42 19.0	127.3	41 42.2	128.4	41 05.0	129.4	40 27.3	130.5	39 48.9	131.5	30
20	44 12.6	129.4	43 34.3	130.5	42 55.3	131.3	42 15.7	132.5	41 35.7	133.5	20
10	46 02.9	131.6	45 22.6	132.8	44 41.9	133.7	44 00.8	134.7	43 18.9	135.7	10
2 00	47 49.2	134.0	47 07.2	135.1	46 24.6	136.1	45 41.5	137.1	44 57.9	138.1	2 00
1 50	49 31.0	136.6	48 47.2	137.7	48 02.7	138.7	47 17.8	139.7	46 32.3	140.6	1 50
40	51 08.0	139.4	50 22.2	140.4	49 35.8	141.4	48 49.0	142.4	48 01.7	143.3	40
30	52 39.4	142.4	51 51.4	143.5	51 03.1	144.4	50 14.6	145.3	49 25.3	146.2	30
20	54 04.3	145.7	53 14.5	146.7	52 24.3	147.6	51 33.6	148.5	50 42.7	149.3	20
10	55 22.2	149.3	54 30.4	150.2	53 38.3	151.0	52 45.9	151.8	51 53.1	152.6	10
1 00	56 32.1	153.0	55 38.6	153.9	54 44.6	154.6	53 50.3	155.4	52 55.9	156.1	1 00
0 50	57 33.2	157.0	56 38.1	157.8	55 42.4	158.4	54 46.4	159.1	53 50.6	159.7	0 50
40	58 25.0	161.3	57 28.0	161.9	56 30.9	162.5	55 33.5	163.0	54 36.3	163.5	40
30	58 05.9	165.8	58 07.6	166.3	57 09.2	166.7	56 11.0	167.1	55 12.3	167.5	30
20	59 35.6	170.4	58 36.6	170.8	57 37.4	171.1	56 38.0	171.3	55 38.7	171.6	20
10	59 53.9	175.2	58 54.1	175.3	57 54.3	175.5	56 54.5	175.6	55 54.6	175.8	10
0 00	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 43.0	111.2	1 25.8	112.2	1 08.6	113.2	0 51.3	114.1	0 34.1	115.1	5 30
20	3 57.7	111.9	3 39.7	112.9	3 21.4	113.9	3 03.2	114.8	2 44.9	115.8	20
10	6 11.8	112.6	5 52.7	113.6	5 33.6	114.6	5 14.3	115.5	4 55.1	116.5	10
5 00	8 25.1	113.4	8 05.2	114.4	7 44.9	115.3	7 24.7	116.3	7 04.3	117.2	5 00
4 50	10 37.6	114.2	10 16.7	115.2	9 55.5	116.1	9 34.2	117.1	9 12.7	118.0	4 50
40	12 49.3	115.1	12 27.3	116.1	12 05.1	117.0	11 42.7	118.0	11 20.0	118.9	40
30	15 00.1	116.0	14 37.0	117.0	14 13.7	117.9	13 50.2	118.9	13 26.3	119.8	30
20	17 09.7	117.0	16 45.6	118.0	16 21.1	118.9	15 56.4	119.8	15 31.5	120.8	20
10	19 18.3	118.0	18 53.0	119.0	18 27.3	119.9	18 01.4	120.8	17 35.3	121.8	10
4 00	21 25.6	119.1	20 59.2	120.0	20 32.3	121.0	20 05.2	121.9	19 37.8	122.9	4 00
3 50	23 31.6	120.2	23 03.9	121.1	22 35.8	122.1	22 07.5	123.1	21 38.7	124.0	3 50
40	25 36.0	121.4	25 07.1	122.3	24 37.7	123.3	24 08.0	124.3	23 37.9	125.2	40
30	27 38.9	122.7	27 08.6	123.6	26 37.9	124.6	26 06.8	125.6	25 35.3	126.5	30
20	29 39.8	124.1	29 08.3	125.0	28 36.1	126.0	28 03.6	127.0	27 30.7	127.9	20
10	31 38.9	125.6	31 05.7	126.5	30 32.2	127.5	29 58.3	128.5	29 23.9	129.4	10
3 00	33 35.6	127.1	33 01.1	128.1	32 26.0	129.0	31 50.6	130.0	31 14.7	130.9	3 00
2 50	35 30.0	128.7	34 53.9	129.7	34 17.2	130.7	33 40.2	131.7	33 02.8	132.6	2 50
40	37 21.5	130.5	36 43.8	131.5	36 05.6	132.5	35 27.0	133.4	34 47.9	134.4	40
30	39 10.0	132.4	38 30.7	133.4	37 50.9	134.4	37 10.6	135.3	36 29.8	136.3	30
20	40 55.2	134.5	40 14.2	135.4	39 32.7	136.4	38 50.7	137.3	38 08.3	138.3	20
10	42 36.6	136.7	41 53.8	137.6	41 10.6	138.6	40 27.0	139.5	39 42.8	140.0	10
2 00	44 13.8	139.0	43 29.3	139.9	42 44.3	140.9	41 58.9	141.8	41 13.1	142.6	2 00
1 50	45 46.5	141.5	45 00.2	142.4	44 13.3	143.3	43 26.2	144.2	42 38.6	145.0	1 50
40	47 13.9	144.2	46 25.8	145.1	45 37.2	145.9	44 48.4	146.8	43 59.1	147.6	40
30	48 35.7	147.1	47 45.8	147.9	46 55.5	148.7	46 05.0	149.6	45 13.9	150.3	30
20	49 51.2	150.1	48 59.7	150.9	48 07.6	151.6	47 15.4	152.4	46 22.8	153.1	20
10	51 00.0	153.3	50 06.6	154.1	49 13.1	154.7	48 19.1	155.4	47 24.9	156.1	10
1 00	52 01.1	156.7	51 06.4	157.4	50 11.2	158.0	49 15.8	158.6	48 20.3	159.2	1 00
0 50	52 54.3	160.3	51 57.9	160.9	51 01.3	161.4	50 04.7	161.9	49 07.9	162.4	0 50
40	53 38.7	164.0	52 41.2	164.5	51 43.4	165.0	50 45.6	165.4	49 47.6	165.8	40
30	54 13.9	167.9	53 15.2	168.3	52 16.6	168.6	51 17.8	168.9	50 19.1	169.2	30
20	54 39.3	171.9	53 40.1	172.1	52 40.6	172.3	51 41.2	172.6	50 41.7	172.8	20
10	54 54.8	175.9	53 55.0	176.1	52 55.1	176.2	51 55.3	176.3	50 55.4	176.4	10
0 00	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridan, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 16. 6	89. 0	0 33. 1	88. 1	0 49. 6	87. 1	1 06. 1	86. 2	6 00
5 50	2 24. 2	90. 7	2 40. 8	89. 7	2 57. 2	88. 8	3 13. 7	87. 8	3 30. 1	86. 8	5 50
40	4 48. 4	91. 4	5 04. 9	90. 4	5 21. 4	89. 4	5 37. 7	88. 5	5 54. 0	87. 5	40
30	7 12. 4	92. 1	7 29. 1	91. 1	7 45. 5	90. 1	8 01. 9	89. 2	8 18. 1	88. 2	30
20	9 36. 5	92. 8	9 53. 2	91. 8	10 09. 8	90. 8	10 26. 1	89. 9	10 42. 3	88. 9	20
10	12 00. 5	93. 5	12 17. 3	92. 5	12 33. 9	91. 5	12 50. 3	90. 5	13 06. 4	89. 5	10
5 00	14 24. 4	94. 2	14 41. 3	93. 2	14 58. 1	92. 2	15 14. 5	91. 2	15 30. 6	90. 2	5 00
4 50	16 48. 1	95. 0	17 05. 2	94. 0	17 22. 1	93. 0	17 38. 6	92. 0	17 54. 8	90. 9	4 50
40	19 11. 7	95. 7	19 29. 0	94. 7	19 46. 1	93. 7	20 02. 7	92. 7	20 19. 0	91. 7	40
30	21 35. 0	96. 5	21 52. 6	95. 5	22 09. 8	94. 4	22 26. 7	93. 4	22 43. 0	92. 4	30
20	23 58. 2	97. 3	24 16. 0	96. 3	24 33. 6	95. 2	24 50. 5	94. 2	25 07. 1	93. 1	20
10	26 21. 0	98. 2	26 39. 2	97. 1	26 56. 9	96. 0	27 14. 2	95. 0	27 31. 0	93. 9	10
4 00	28 43. 6	99. 0	29 02. 2	98. 0	29 20. 4	96. 9	29 37. 8	95. 8	29 54. 8	94. 7	4 00
3 50	31 05. 8	99. 9	31 24. 8	98. 9	31 43. 2	97. 8	32 01. 2	96. 6	32 18. 3	95. 5	3 50
40	33 27. 6	100. 9	33 47. 1	99. 8	34 06. 1	98. 7	34 24. 3	97. 5	34 41. 8	96. 3	40
30	35 48. 9	101. 9	36 09. 1	100. 8	36 28. 3	99. 6	36 47. 0	98. 4	37 05. 0	97. 2	30
20	38 09. 7	103. 0	38 30. 4	101. 8	38 50. 4	100. 6	39 09. 5	99. 4	39 28. 0	98. 2	20
10	40 29. 8	104. 2	40 51. 2	102. 9	41 11. 9	101. 7	41 31. 6	100. 4	41 50. 4	99. 2	10
3 00	42 49. 3	105. 4	43 11. 5	104. 1	43 32. 8	102. 9	43 53. 1	101. 6	44 12. 6	100. 2	3 00
2 50	45 07. 8	106. 7	45 30. 8	105. 4	45 52. 9	104. 1	46 14. 0	102. 7	46 34. 1	101. 4	2 50
40	47 25. 4	108. 2	47 49. 4	106. 8	48 12. 5	105. 4	48 34. 3	104. 0	48 55. 3	102. 6	40
30	49 41. 8	109. 8	50 06. 8	108. 4	50 30. 9	106. 9	50 53. 6	105. 5	51 15. 5	104. 0	30
20	51 56. 7	111. 5	52 23. 0	110. 0	52 48. 3	108. 5	53 12. 3	107. 0	53 35. 1	105. 5	20
10	54 10. 0	113. 4	54 37. 6	111. 9	55 04. 1	110. 3	55 29. 4	108. 7	55 53. 4	107. 1	10
2 00	56 21. 2	115. 5	56 50. 5	113. 9	57 18. 7	112. 3	57 45. 3	110. 6	58 10. 6	108. 9	2 00
1 50	58 30. 0	117. 9	59 01. 0	116. 3	59 30. 9	114. 6	59 59. 1	112. 8	60 26. 1	110. 0	1 50
40	60 35. 9	120. 6	61 09. 0	118. 9	61 40. 9	117. 1	62 10. 9	115. 3	62 39. 7	113. 4	40
30	62 38. 0	123. 7	63 13. 4	121. 9	63 47. 4	120. 0	64 19. 8	118. 1	64 50. 5	116. 1	30
20	64 35. 6	127. 1	65 13. 6	125. 3	65 50. 2	123. 4	66 24. 9	121. 4	66 58. 4	119. 3	20
10	66 27. 4	131. 2	67 08. 2	129. 3	67 47. 8	127. 3	68 25. 5	125. 3	69 01. 8	123. 1	10
1 00	68 12. 2	135. 8	68 56. 2	134. 0	69 38. 9	132. 0	70 20. 0	129. 8	70 59. 6	127. 5	1 00
0 50	69 47. 8	141. 2	70 35. 1	139. 4	71 21. 5	137. 4	72 06. 0	135. 3	72 49. 8	133. 0	0 50
40	71 12. 1	147. 4	72 03. 0	145. 7	72 52. 9	143. 8	73 41. 8	141. 9	74 29. 5	139. 6	40
30	72 22. 3	154. 5	73 16. 5	153. 0	74 10. 2	151. 4	75 02. 8	149. 7	75 55. 0	147. 6	30
20	73 15. 4	162. 4	74 12. 7	161. 3	75 09. 5	160. 1	76 06. 1	158. 8	77 01. 9	157. 2	20
10	73 48. 7	171. 0	74 47. 9	170. 4	75 47. 1	169. 8	76 46. 2	169. 1	77 45. 1	168. 2	10
0 00	74 0. 0	180. 0	75 0. 0	180. 0	76 0. 0	180. 0	77 0. 0	180. 0	78 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 05.8	80.7	6 10
6 00	1 22.6	85.2	1 39.1	84.3	1 55.5	83.3	2 11.9	82.3	2 28.3	81.4	6 00
5 50	3 46.4	85.9	4 02.6	84.9	4 18.8	84.0	4 34.9	83.0	4 50.9	82.0	5 50
40	6 10.2	86.6	6 26.3	85.6	6 42.3	84.6	6 58.1	83.6	7 13.8	82.7	40
30	8 34.2	87.2	8 50.1	86.2	9 05.9	85.3	9 21.4	84.3	9 36.9	83.3	30
20	10 58.2	87.9	11 14.1	86.9	11 29.6	85.9	11 45.0	84.9	12 00.2	84.0	20
10	13 22.4	88.6	13 38.1	87.6	13 53.6	86.6	14 08.7	85.6	14 23.8	84.6	10
5 00	15 46.5	89.2	16 02.1	88.2	16 17.5	87.2	16 32.5	86.2	16 47.3	85.2	5 00
4 50	18 10.7	89.9	18 26.3	88.9	18 41.6	87.9	18 56.5	86.8	19 11.0	85.8	4 50
40	20 34.9	90.6	20 50.5	89.6	21 05.7	88.6	21 20.5	87.5	21 35.0	86.5	40
30	22 59.1	91.3	23 14.7	90.3	23 29.9	89.2	23 44.6	88.1	23 58.9	87.1	30
20	25 23.2	92.0	25 38.8	91.0	25 54.0	89.9	26 08.7	88.8	26 22.9	87.7	20
10	27 47.2	92.8	28 03.0	91.7	28 18.2	90.6	28 32.9	89.5	28 47.0	88.4	10
4 00	30 11.2	93.6	30 27.1	92.4	30 42.4	91.3	30 57.0	90.2	31 11.2	89.1	4 00
3 50	32 35.1	94.3	32 51.1	93.2	33 06.4	92.0	33 21.3	90.9	33 35.4	89.7	3 50
40	34 58.7	95.1	35 15.0	94.0	35 30.5	92.8	35 45.4	91.6	35 59.6	90.4	40
30	37 22.2	96.0	37 38.8	94.8	37 54.5	93.6	38 09.5	92.4	38 23.7	91.1	30
20	39 45.5	96.9	40 02.3	95.7	40 18.4	94.4	40 33.5	93.2	40 47.8	91.9	20
10	42 08.6	97.9	42 25.8	96.6	42 42.0	95.3	42 57.5	94.0	43 12.0	92.6	10
3 00	44 31.1	98.9	44 48.8	97.6	45 05.5	96.2	45 21.2	94.8	45 35.9	93.4	3 00
2 50	46 53.4	100.0	47 11.5	98.6	47 28.7	97.2	47 44.8	95.8	47 59.8	94.3	2 50
40	49 15.0	101.2	49 33.9	99.7	49 51.6	98.3	50 08.1	96.8	50 23.4	95.2	40
30	51 36.2	102.5	51 55.8	100.9	52 14.0	99.4	52 31.1	97.8	52 47.0	96.2	30
20	53 56.6	103.9	54 17.0	102.3	54 36.1	100.6	54 53.8	99.0	55 10.1	97.3	20
10	56 16.0	105.4	56 37.5	103.8	56 57.4	102.0	57 15.9	100.3	57 32.9	98.5	10
2 00	58 34.5	107.2	58 57.1	105.4	59 18.1	103.6	59 37.5	101.7	59 55.3	99.8	2 00
1 50	60 51.5	109.2	61 15.4	107.3	61 37.7	105.3	61 58.1	103.3	62 17.0	101.3	1 50
40	63 06.6	111.4	63 32.4	109.3	63 56.2	107.2	64 17.9	105.2	64 38.0	103.0	40
30	65 19.8	114.0	65 47.2	111.9	66 12.8	109.6	66 36.4	107.4	66 57.8	105.0	30
20	67 29.8	117.1	67 59.8	114.8	68 27.5	112.4	68 53.1	109.9	69 16.4	107.3	20
10	70 36.2	120.7	70 09.0	118.2	70 39.0	115.7	71 07.2	113.0	71 33.0	110.2	10
1 00	71 37.3	125.1	72 13.2	122.5	72 46.9	119.8	73 18.1	116.9	73 46.7	113.7	1 00
0 50	73 31.2	130.5	74 11.0	127.7	74 48.5	124.9	75 24.0	121.8	75 56.4	118.3	0 50
40	75 15.3	137.2	75 59.8	134.4	76 42.2	131.5	77 22.3	128.1	77 59.6	124.4	40
30	76 45.5	145.4	77 35.2	142.8	78 23.0	140.0	79 09.0	136.6	79 52.4	132.8	30
20	77 57.2	155.4	78 51.8	153.3	79 45.3	150.9	80 37.4	148.0	81 28.0	144.6	20
10	78 43.7	167.1	79 42.2	165.9	80 40.5	164.5	81 38.0	162.7	82 35.2	160.5	10
0 00	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 22.7	79.7	0 39.4	78.7	0 56.1	77.8	1 12.8	76.8	1 29.5	75.9	6 10
6 00	2 44.6	80.4	3 00.9	79.4	3 17.1	78.5	3 33.3	77.5	3 49.4	76.5	6 00
5 50	5 06.9	81.1	5 22.8	80.1	5 38.5	79.1	5 54.2	78.1	6 09.9	77.2	5 50
40	7 29.5	81.7	7 44.9	80.7	8 00.2	79.7	8 15.5	78.8	8 30.5	77.8	40
30	9 52.2	82.3	10 07.3	81.3	10 22.3	80.3	10 37.0	79.4	10 51.7	78.4	30
20	12 15.3	83.0	12 30.0	82.0	12 44.6	81.0	12 59.0	80.0	13 13.0	79.0	20
10	14 38.4	83.6	14 52.9	82.6	15 07.2	81.6	15 21.1	80.6	15 34.8	79.5	10
5 00	17 01.8	84.2	17 16.0	83.2	17 29.8	82.2	17 43.4	81.1	17 56.6	80.1	5 00
4 50	19 25.4	84.8	19 39.3	83.8	19 52.8	82.7	20 05.9	81.7	20 18.9	80.7	4 50
40	21 49.0	85.4	22 02.6	84.4	22 15.9	83.3	22 28.8	82.3	22 41.1	81.2	40
30	24 12.8	86.0	24 26.3	85.0	24 39.3	83.9	24 51.9	82.8	25 03.8	81.7	30
20	26 36.7	86.7	26 49.9	85.6	27 02.6	84.5	27 14.9	83.4	27 26.5	82.3	20
10	29 00.7	87.3	29 13.8	86.2	29 26.1	85.0	29 38.1	83.9	29 49.5	82.8	10
4 00	31 24.7	87.9	31 37.6	86.8	31 49.9	85.6	32 01.6	84.4	32 12.6	83.3	4 00
3 50	33 48.8	88.5	34 01.7	87.4	34 13.8	86.2	34 25.1	85.0	34 36.0	83.8	3 50
40	36 13.0	89.2	36 25.7	88.0	36 37.7	86.8	36 48.9	85.6	36 59.3	84.3	40
30	38 37.3	89.9	38 49.9	88.6	39 01.7	87.4	39 12.7	86.1	39 22.9	84.8	30
20	41 01.4	90.6	41 14.0	89.3	41 25.7	88.0	41 36.6	86.7	41 46.5	85.4	20
10	43 25.6	91.3	43 38.2	90.0	43 49.9	88.6	44 00.6	87.2	44 10.3	85.9	10
3 00	45 49.7	92.1	46 02.3	90.7	46 14.0	89.2	46 24.7	87.8	46 34.1	86.4	3 00
2 50	48 13.8	92.9	48 26.5	91.4	48 38.2	89.9	48 48.6	88.4	48 58.2	86.9	2 50
40	50 37.6	93.7	50 50.6	92.2	51 02.4	90.6	51 12.9	89.0	51 22.1	87.5	40
30	53 01.5	94.6	53 14.8	93.0	53 26.6	91.4	53 37.0	89.7	53 46.2	88.0	30
20	55 25.0	95.6	55 38.7	93.9	55 50.7	92.2	56 01.3	90.4	56 10.3	88.6	20
10	57 48.4	96.7	58 02.4	94.9	58 14.7	93.0	58 25.4	91.1	58 34.5	89.3	10
2 00	60 11.5	97.9	60 26.0	95.9	60 38.7	93.9	60 49.6	91.9	60 58.6	90.0	2 00
1 50	62 34.1	99.2	62 49.3	97.1	63 02.4	95.0	63 13.6	92.8	63 22.8	90.6	1 50
40	64 56.0	100.8	65 11.9	98.5	65 25.8	96.2	65 37.7	93.8	65 46.9	91.4	40
30	67 17.4	102.6	67 34.4	100.1	67 49.2	97.5	68 01.2	94.9	68 11.2	92.3	30
20	69 37.4	104.7	69 56.0	101.9	70 11.8	99.1	70 25.0	96.2	70 35.0	93.2	20
10	71 56.0	107.3	72 16.5	104.2	72 33.7	101.0	72 47.8	97.7	72 59.2	94.4	10
1 00	74 12.7	110.5	74 35.3	107.0	74 54.6	103.5	75 10.6	99.7	75 22.5	95.9	1 00
0 50	76 25.7	114.7	76 52.0	110.8	77 14.0	106.7	77 32.4	102.2	77 46.0	97.8	0 50
40	78 33.7	120.4	79 04.2	115.9	79 30.5	111.1	79 52.0	105.8	80 08.2	100.4	40
30	80 33.0	128.5	81 10.0	123.5	81 41.5	117.9	82 08.5	111.5	82 29.5	104.5	30
20	82 16.3	140.3	83 01.5	135.2	83 42.7	128.9	84 18.3	121.1	84 46.3	111.8	20
10	83 31.5	157.6	84 26.5	153.8	85 19.3	148.4	86 08.8	140.7	86 51.8	129.3	10
0 00	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 01.6	72.3	0 18.9	71.4	0 36.2	70.4	6 20
10	1 46.1	74.9	2 02.7	73.9	2 19.2	73.0	2 35.8	72.0	2 52.2	71.0	10
6 00	4 05.5	75.6	4 21.4	74.6	4 37.3	73.6	4 53.2	72.6	5 08.9	71.7	6 00
5 50	6 25.6	76.2	6 40.7	75.2	6 55.9	74.2	7 11.1	73.3	7 26.0	72.3	5 50
40	8 45.6	76.8	9 00.3	75.8	9 14.9	74.8	9 29.3	73.9	9 43.6	72.9	40
30	11 05.8	77.4	11 20.2	76.4	11 34.1	75.4	11 48.0	74.4	12 01.6	73.4	30
20	13 26.9	78.0	13 40.6	77.0	13 54.0	76.0	14 07.1	75.0	14 20.0	74.0	20
10	15 48.1	78.5	16 01.2	77.5	16 14.0	76.5	16 26.6	75.5	16 38.7	74.5	10
5 00	18 09.6	79.1	18 22.1	78.1	18 34.4	77.0	18 46.3	76.0	18 57.8	75.0	5 00
4 50	20 31.3	79.6	20 43.3	78.6	20 55.0	77.5	21 06.4	76.5	21 17.2	75.4	4 50
40	22 53.2	80.1	23 04.8	79.1	23 15.9	78.0	23 26.6	76.9	23 36.9	75.9	40
30	25 15.3	80.7	25 26.5	79.6	25 37.1	78.5	25 47.2	77.4	25 56.8	76.3	30
20	27 37.8	81.2	27 48.4	80.1	27 58.5	78.9	28 08.0	77.8	28 17.1	76.7	20
10	30 00.3	81.7	30 10.5	80.5	30 20.1	79.4	30 29.3	78.2	30 37.5	77.1	10
4 00	32 23.1	82.1	32 32.8	81.0	32 41.9	79.8	32 50.3	78.6	32 58.1	77.4	4 00
3 50	34 45.9	82.6	34 55.2	81.4	35 03.8	80.2	35 11.8	79.0	35 18.9	77.8	3 50
40	37 09.1	83.1	37 17.9	81.8	37 26.1	80.6	37 33.4	79.4	37 39.9	78.1	40
30	39 32.2	83.6	39 40.8	82.3	39 48.4	81.0	39 55.2	79.7	40 01.0	78.4	30
20	41 55.6	84.0	42 03.7	82.7	42 10.9	81.4	42 17.1	80.0	42 22.4	78.7	20
10	44 19.0	84.5	44 26.8	83.1	44 33.5	81.7	44 39.2	80.3	44 43.7	78.9	10
3 00	46 42.6	84.9	46 50.0	83.5	46 56.3	82.0	47 01.3	80.6	47 05.3	79.1	3 00
2 50	49 06.2	85.4	49 13.2	83.9	49 19.0	82.4	49 23.8	80.8	49 26.8	79.3	2 50
40	51 30.1	85.9	51 36.7	84.2	51 42.1	82.7	51 46.0	81.1	51 48.7	79.4	40
30	53 53.9	86.3	54 00.2	84.6	54 05.0	83.0	54 08.6	81.2	54 10.5	79.5	30
20	56 17.9	86.8	56 23.9	85.0	56 28.2	83.2	56 31.0	81.4	56 32.3	79.6	20
10	58 41.8	87.3	58 47.5	85.4	58 51.4	83.5	58 53.9	81.6	58 54.1	79.6	10
2 00	61 05.9	87.8	61 11.4	85.8	61 14.7	83.7	61 16.2	81.6	61 15.9	79.6	2 00
1 50	63 30.0	88.4	63 35.1	86.1	63 38.0	83.9	63 39.0	81.6	63 37.6	79.4	1 50
40	65 54.3	89.0	65 59.1	86.5	66 01.6	84.1	66 01.6	81.6	65 59.4	79.1	40
30	68 18.2	89.6	68 23.0	86.9	68 24.8	84.2	68 24.5	81.4	68 20.8	78.7	30
20	70 42.7	90.2	70 47.0	87.2	70 48.4	84.2	70 46.7	81.2	70 42.1	78.1	20
10	73 06.5	91.0	73 11.0	87.6	73 11.5	84.1	73 09.2	80.7	73 02.7	77.2	10
1 00	75 31.0	91.9	75 35.1	87.9	75 35.1	83.9	75 35.1	80.0	75 23.2	76.0	1 00
0 50	77 55.0	93.1	77 59.4	88.3	77 58.4	83.5	77 53.0	78.8	77 42.5	74.1	0 50
40	80 18.7	94.6	80 23.2	88.6	80 21.6	82.7	80 13.7	76.7	80 00.3	71.1	40
30	82 42.0	96.9	82 47.5	89.0	82 44.5	81.0	82 33.5	73.3	82 15.5	66.2	30
20	85 04.7	101.0	85 11.6	89.3	85 06.2	77.5	84 49.0	66.6	84 22.0	57.1	20
10	87 23.5	112.2	87 35.6	89.6	87 24.0	67.0	86 53.0	49.7	86 10.1	38.0	10
0 00	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 53.4	69.4	1 10.7	68.5	1 27.9	67.5	1 45.2	66.6	2 02.3	65.6	6 20
10	3 08.7	70.1	3 25.2	69.1	3 41.4	68.1	3 57.7	67.2	4 14.0	66.2	10
6 00	5 24.6	70.7	5 40.1	69.7	5 55.6	68.8	6 10.9	67.8	6 26.2	66.8	6 00
5 50	7 40.8	71.3	7 55.7	70.3	8 10.3	69.4	8 24.7	68.4	8 39.0	67.4	5 50
40	9 57.7	71.9	10 11.6	70.9	10 25.5	69.9	10 39.0	68.9	10 52.5	67.9	40
30	12 15.0	72.4	12 28.2	71.4	12 41.1	70.4	12 53.7	69.4	13 06.2	68.4	30
20	14 32.7	73.0	14 45.0	71.9	14 57.2	70.9	15 09.0	69.9	15 20.6	68.9	20
10	16 50.7	73.5	17 02.4	72.4	17 13.6	71.4	17 24.6	70.4	17 35.3	69.3	10
5 00	19 09.1	73.9	19 19.9	72.9	19 30.5	71.8	19 40.6	70.8	19 50.4	69.7	5 00
4 50	21 27.7	74.4	21 37.9	73.3	21 47.6	72.2	21 57.0	71.2	22 05.7	70.1	4 50
40	23 46.8	74.8	23 56.1	73.7	24 05.1	72.6	24 13.5	71.5	24 21.6	70.5	40
30	26 06.0	75.2	26 14.7	74.1	26 22.8	73.0	26 30.4	71.9	26 37.6	70.8	30
20	28 25.5	75.6	28 33.4	74.4	28 40.8	73.3	28 47.6	72.2	28 53.8	71.0	20
10	30 45.2	75.9	30 52.5	74.7	30 59.0	73.6	31 04.9	72.4	31 10.2	71.3	10
4 00	33 05.3	76.3	33 11.6	75.1	33 17.5	73.9	33 22.5	72.7	33 26.9	71.5	4 00
3 50	35 25.3	76.5	35 31.2	75.3	35 36.0	74.1	35 40.2	72.9	35 43.7	71.6	3 50
40	37 45.8	76.8	37 50.6	75.6	37 54.8	74.3	37 58.1	73.0	38 00.6	71.8	40
30	40 06.2	77.0	40 10.4	75.8	40 13.6	74.5	40 16.0	73.2	40 17.6	71.9	30
20	42 26.8	77.3	42 30.1	76.0	42 32.7	74.6	42 34.1	73.2	42 34.6	71.9	20
10	44 47.4	77.5	44 50.2	76.1	44 51.7	74.7	44 52.1	73.3	44 51.6	71.9	10
3 00	47 08.3	77.6	47 10.0	76.2	47 10.8	74.7	47 10.2	73.2	47 08.6	71.8	3 00
2 50	49 29.1	77.7	49 30.1	76.2	49 29.7	74.7	49 28.2	73.1	49 25.2	71.6	2 50
40	51 50.1	77.8	51 50.1	76.2	51 48.9	74.6	51 46.1	73.0	51 42.2	71.4	40
30	54 11.0	77.8	54 10.2	76.1	54 07.7	74.4	54 03.8	72.7	53 58.6	71.0	30
20	56 32.0	77.8	56 30.0	76.0	56 26.6	74.2	56 21.5	72.4	56 14.9	70.6	20
10	58 52.8	77.7	58 50.0	75.8	58 45.0	73.8	58 38.8	71.9	58 30.6	69.9	10
2 00	61 13.7	77.5	61 09.5	75.4	61 03.6	73.3	60 55.5	71.3	60 45.9	69.2	2 00
1 50	63 34.2	77.2	63 29.0	74.9	63 21.5	72.7	63 11.7	70.5	63 00.2	68.4	1 50
40	65 54.9	76.7	65 47.9	74.3	65 38.8	71.9	65 27.2	69.5	65 13.7	67.1	40
30	68 15.0	76.0	68 06.5	73.4	67 55.3	70.8	67 41.7	68.2	67 25.8	65.6	30
20	70 34.8	75.2	70 24.1	72.2	70 10.9	69.3	69 54.8	66.5	69 36.3	63.7	20
10	72 53.5	74.0	72 40.7	70.6	72 24.7	67.4	72 05.7	64.2	71 44.1	61.3	10
1 00	75 11.7	72.1	74 55.8	68.4	74 36.9	64.8	74 14.3	61.3	73 48.7	58.0	1 00
0 50	77 28.0	69.6	77 08.5	65.2	76 45.2	61.2	76 18.1	57.3	75 48.0	53.8	0 50
40	79 41.1	65.8	79 17.0	60.7	78 48.6	56.1	78 15.8	51.8	77 40.1	48.0	40
30	81 49.0	59.6	81 18.5	53.7	80 42.5	48.6	80 03.0	44.1	79 20.7	40.2	30
20	83 47.3	49.2	83 06.5	42.7	82 21.7	37.4	81 33.8	33.1	80 43.5	29.6	20
10	85 20.8	30.3	84 28.0	25.0	83 33.1	21.1	82 36.8	18.2	81 39.8	16.1	10
0 00	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	82 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 24. 2	90. 7	2 07. 7	91. 6	1 51. 0	92. 6	1 34. 4	93. 6	1 17. 8	94. 5	5 50
40	4 48. 4	91. 4	4 31. 7	92. 3	4 15. 0	93. 3	3 58. 2	94. 3	3 41. 3	95. 2	40
30	7 12. 4	92. 1	6 55. 8	93. 0	6 38. 8	94. 0	6 21. 9	95. 0	6 04. 9	95. 9	30
20	9 36. 5	92. 8	9 19. 6	93. 8	9 02. 7	94. 7	8 45. 5	95. 7	8 28. 2	96. 7	20
10	12 00. 5	93. 5	11 43. 5	94. 5	11 26. 2	95. 5	11 08. 9	96. 4	10 51. 4	97. 4	10
5 00	14 24. 4	94. 2	14 07. 1	95. 2	13 49. 8	96. 2	13 32. 1	97. 2	13 14. 1	98. 2	5 00
4 50	16 48. 1	95. 0	16 30. 7	96. 0	16 12. 9	97. 0	15 55. 0	98. 0	15 36. 8	99. 0	4 50
40	19 11. 7	95. 7	18 53. 9	96. 7	18 36. 0	97. 8	18 17. 6	98. 8	17 59. 0	99. 8	40
30	21 35. 0	96. 5	21 17. 1	97. 5	20 58. 8	98. 6	20 40. 0	99. 6	20 20. 8	100. 6	30
20	23 58. 2	97. 3	23 39. 8	98. 4	23 21. 2	99. 4	23 02. 0	100. 4	22 42. 5	101. 5	20
10	26 21. 0	98. 2	26 02. 3	99. 3	25 43. 2	100. 3	25 23. 6	101. 3	25 03. 6	102. 4	10
4 00	28 43. 6	99. 0	28 24. 5	100. 1	28 04. 9	101. 2	27 44. 7	102. 2	27 25. 1	103. 3	4 00
3 50	31 05. 8	99. 9	30 46. 2	101. 1	30 26. 0	102. 2	30 05. 4	103. 2	29 44. 2	104. 3	3 50
40	33 27. 6	100. 9	33 07. 4	102. 1	32 46. 8	103. 2	32 25. 4	104. 3	32 03. 5	105. 4	40
30	35 48. 9	101. 9	35 28. 3	103. 1	35 06. 8	104. 3	34 44. 8	105. 4	34 22. 2	106. 5	30
20	38 09. 7	103. 0	37 48. 3	104. 2	37 26. 3	105. 4	37 03. 5	106. 6	36 40. 0	107. 7	20
10	40 29. 8	104. 2	40 07. 7	105. 4	39 44. 9	106. 6	39 21. 2	107. 8	38 56. 9	109. 0	10
3 00	42 49. 3	105. 4	42 26. 3	106. 7	42 02. 6	107. 9	41 38. 0	109. 1	41 12. 7	110. 4	3 00
2 50	45 07. 8	106. 7	44 43. 9	108. 0	44 19. 2	109. 4	43 53. 6	110. 6	43 27. 2	111. 9	2 50
40	47 25. 4	108. 2	47 00. 4	109. 5	46 34. 8	110. 9	46 07. 9	112. 1	45 40. 3	113. 4	40
30	49 41. 8	109. 8	49 15. 6	111. 1	48 48. 6	112. 5	48 20. 6	113. 8	47 51. 8	115. 2	30
20	51 56. 7	111. 5	51 29. 3	112. 9	51 01. 1	114. 3	50 31. 7	115. 7	50 01. 2	117. 1	20
10	54 10. 0	113. 4	53 41. 1	114. 9	53 11. 2	116. 4	52 40. 2	117. 8	52 08. 4	119. 2	10
2 00	56 21. 2	115. 5	55 50. 7	117. 1	55 19. 4	118. 6	54 46. 7	120. 0	54 12. 9	121. 5	2 00
1 50	58 30. 0	117. 9	57 57. 8	119. 5	57 24. 4	121. 1	56 49. 9	122. 5	56 14. 4	124. 0	1 50
40	60 35. 9	120. 6	60 01. 6	122. 2	59 26. 3	123. 9	58 49. 5	125. 4	58 11. 7	126. 9	40
30	62 38. 0	123. 7	62 01. 4	125. 3	61 23. 8	127. 0	60 44. 8	128. 6	60 04. 6	130. 1	30
20	64 35. 6	127. 1	63 56. 5	128. 8	63 16. 2	130. 5	62 34. 7	132. 1	61 52. 1	133. 6	20
10	66 27. 4	131. 2	65 45. 5	132. 9	65 02. 4	134. 6	64 18. 2	136. 2	63 33. 0	137. 6	10
1 00	68 12. 2	135. 8	67 27. 0	137. 5	66 41. 1	139. 2	65 53. 9	140. 7	65 05. 8	142. 0	1 00
0 50	69 47. 8	141. 2	68 59. 5	142. 8	68 10. 2	144. 4	67 20. 0	145. 9	66 29. 2	147. 2	0 50
40	71 12. 1	147. 4	70 20. 3	148. 9	69 27. 9	150. 4	68 34. 9	151. 7	67 41. 3	152. 8	40
30	72 22. 3	154. 5	71 27. 4	155. 8	70 32. 0	157. 0	69 36. 2	158. 0	68 40. 2	159. 0	30
20	73 15. 4	162. 4	72 17. 8	163. 4	71 20. 2	164. 2	70 22. 7	165. 0	69 23. 9	165. 7	20
10	73 48. 7	171. 0	72 49. 3	171. 5	71 49. 9	172. 0	70 50. 5	172. 4	69 50. 9	172. 8	10
0 00	74 0. 0	180. 0	73 0. 0	180. 0	72 0. 0	180. 0	71 0. 0	180. 0	70 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	1 01. 1	95. 5	0 44. 3	96. 5	0 27. 6	97. 4	0 10. 9	98. 4			5 50
40	3 24. 4	96. 2	3 07. 5	97. 2	2 50. 5	98. 1	2 33. 4	99. 1	2 16. 2	100. 0	40
30	5 47. 8	96. 9	5 30. 4	97. 9	5 12. 1	98. 8	4 55. 6	99. 8	4 38. 0	100. 8	30
20	8 10. 7	97. 6	7 53. 1	98. 6	7 35. 3	99. 5	7 17. 5	100. 5	6 59. 5	101. 5	20
10	10 33. 6	98. 3	10 15. 6	99. 3	9 57. 4	100. 3	9 39. 2	101. 3	9 20. 7	102. 3	10
5 00	12 56. 0	99. 1	12 37. 6	100. 1	12 19. 1	101. 1	12 00. 3	102. 1	11 41. 3	103. 1	5 00
4 50	15 18. 2	99. 9	14 59. 5	100. 9	14 40. 4	101. 9	14 21. 2	102. 9	14 01. 6	103. 9	4 50
40	17 40. 0	100. 7	17 20. 8	101. 7	17 01. 3	102. 7	16 41. 4	103. 7	16 21. 4	104. 7	40
30	20 01. 5	101. 6	19 41. 8	102. 6	19 21. 7	103. 6	19 01. 3	104. 6	18 40. 5	105. 6	30
20	22 22. 5	102. 5	22 02. 2	103. 5	21 41. 5	104. 5	21 20. 5	105. 5	20 59. 0	106. 5	20
10	24 43. 1	103. 4	24 22. 2	104. 4	24 00. 8	105. 5	23 39. 2	106. 5	23 16. 9	107. 5	10
4 00	27 03. 0	104. 4	26 41. 5	105. 4	26 19. 5	106. 5	25 57. 0	107. 5	25 34. 1	108. 5	4 00
3 50	29 22. 4	105. 4	29. 00. 1	106. 5	28 37. 3	107. 6	28 14. 2	108. 6	27 50. 4	109. 6	3 50
40	31 41. 0	106. 5	31 18. 0	107. 6	30 54. 4	108. 7	30 30. 3	109. 7	30 05. 7	110. 8	40
30	33 58. 9	107. 6	33 35. 1	108. 8	33 10. 6	109. 9	32 45. 6	110. 9	32 20. 0	112. 0	30
20	36 15. 8	108. 8	35 51. 1	110. 0	35 25. 7	111. 1	34 59. 7	112. 2	34 33. 1	113. 3	20
10	38 31. 9	110. 1	38 06. 1	111. 3	37 39. 6	112. 4	37 12. 6	113. 6	36 44. 9	114. 7	10
3 00	40 46. 5	111. 5	40 19. 7	112. 7	39 52. 2	113. 8	39 24. 0	115. 0	38 55. 2	116. 1	3 00
2 50	43 00. 0	113. 1	42 32. 0	114. 3	42 03. 3	115. 4	41 33. 8	116. 6	41 03. 6	117. 7	2 50
40	45 11. 8	114. 7	44 42. 6	115. 9	44 12. 5	117. 1	43 41. 7	118. 3	43 10. 2	119. 5	40
30	47 22. 0	116. 5	46 51. 2	117. 7	46 19. 9	118. 9	45 47. 6	120. 2	45 14. 7	121. 4	30
20	49 29. 9	118. 4	48 57. 8	119. 7	48 24. 8	120. 9	47 51. 0	122. 2	47 16. 4	123. 4	20
10	51 35. 5	120. 5	51 01. 8	121. 8	50 27. 1	123. 1	49 51. 6	124. 4	49 15. 2	125. 6	10
2 00	53 38. 2	122. 8	53 02. 6	124. 2	52 26. 2	125. 5	51 48. 9	126. 8	51 10. 7	128. 0	2 00
1 50	55 37. 6	125. 4	55 00. 0	126. 8	54 21. 6	128. 1	53 42. 3	129. 4	53 02. 2	130. 7	1 50
40	57 32. 8	128. 3	56 53. 3	129. 7	56 12. 8	131. 0	55 31. 4	132. 3	54 49. 2	133. 6	40
30	59 23. 4	131. 5	58 41. 8	132. 9	57 58. 9	134. 2	57 15. 3	135. 5	56 30. 9	136. 8	30
20	61 08. 4	135. 1	60 24. 3	136. 5	59 39. 0	137. 8	58 53. 1	139. 1	58 06. 5	140. 3	20
10	62 46. 8	139. 1	62 00. 0	140. 4	61 12. 3	141. 7	60 23. 9	142. 9	59 35. 0	144. 1	10
1 00	64 16. 8	143. 5	63 27. 5	144. 8	62 37. 3	146. 1	61 46. 6	147. 2	60 55. 3	148. 3	1 00
0 50	65 37. 6	148. 5	64 45. 5	149. 7	63 52. 8	150. 8	62 59. 8	151. 8	62 06. 3	152. 8	0 50
40	66 47. 0	154. 0	65 52. 4	155. 0	64 57. 5	156. 0	64 02. 2	156. 9	63 06. 6	157. 7	40
30	67 43. 5	159. 9	66 46. 8	160. 8	65 49. 8	161. 6	64 52. 7	162. 3	63 55. 2	163. 0	30
20	68 25. 4	166. 3	67 26. 9	166. 9	66 28. 3	167. 5	65 29. 6	168. 0	64 30. 8	168. 5	20
10	68 51. 3	173. 1	67 51. 7	173. 4	66 52. 1	173. 7	65 52. 5	173. 9	64 52. 7	174. 2	10
0 00	69 0. 0	180. 0	68 0. 0	180. 0	67 0. 0	180. 0	66 0. 0	180. 0	65 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

North

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 59. 1	101. 0	1 41. 9	102. 0	1 24. 7	102. 9	1 07. 5	103. 9	0 50. 2	104. 8	5 40
30	4 20. 5	101. 7	4 02. 7	102. 7	3 45. 1	103. 6	3 27. 1	104. 6	3 09. 4	105. 5	30
20	6 41. 5	102. 4	6 23. 3	103. 4	6 05. 0	104. 4	5 46. 6	105. 3	5 28. 0	106. 3	20
10	9 02. 2	103. 2	8 43. 2	104. 2	8 24. 4	105. 1	8 05. 4	106. 1	7 46. 1	107. 1	10
5 00	11 22. 2	104. 0	11 02. 9	105. 0	10 43. 3	105. 9	10 23. 6	106. 9	10 03. 7	107. 9	5 00
4 50	13 41. 9	104. 8	13 21. 9	105. 8	13 01. 7	106. 7	12 41. 2	107. 7	12 20. 7	108. 7	4 50
40	16 01. 0	105. 7	15 40. 3	106. 7	15 19. 5	107. 6	14 58. 3	108. 6	14 36. 9	109. 6	40
30	18 19. 6	106. 6	17 58. 2	107. 6	17 36. 6	108. 5	17 14. 6	109. 5	16 52. 3	110. 5	30
20	20 37. 4	107. 5	20 15. 3	108. 5	19 52. 8	109. 5	19 30. 1	110. 5	19 07. 0	111. 5	20
10	22 54. 5	108. 5	22 31. 6	109. 5	22 08. 2	110. 5	21 44. 7	111. 5	21 20. 7	112. 5	10
4 00	25 10. 8	109. 5	24 47. 0	110. 6	24 22. 9	111. 6	23 58. 4	112. 6	23 33. 5	113. 6	4 00
3 50	27 26. 3	110. 6	27 01. 6	111. 7	26 36. 4	112. 7	26 11. 0	113. 7	25 45. 1	114. 7	3 50
40	29 40. 6	111. 8	29 15. 1	112. 8	28 49. 0	113. 9	28 22. 5	114. 9	27 55. 4	115. 9	40
30	31 54. 0	113. 1	31 27. 4	114. 1	31 00. 2	115. 2	30 32. 6	116. 2	30 04. 3	117. 2	30
20	34 06. 0	114. 4	33 38. 3	115. 4	33 10. 0	116. 5	32 41. 2	117. 5	32 11. 9	118. 6	20
10	36 16. 7	115. 8	35 47. 7	116. 8	35 18. 3	118. 0	34 48. 2	119. 0	34 17. 7	120. 1	10
3 00	38 25. 6	117. 3	37 55. 5	118. 3	37 24. 8	119. 5	36 53. 5	120. 5	36 21. 5	121. 6	3 00
2 50	40 32. 9	118. 9	40 01. 3	120. 0	39 29. 3	121. 1	38 56. 6	122. 2	38 23. 2	123. 3	2 59
40	42 38. 0	120. 6	42 05. 2	121. 8	41 31. 6	122. 9	40 57. 5	124. 0	40 22. 6	125. 0	40
30	44 41. 0	122. 5	44 06. 5	123. 7	43 31. 4	124. 8	42 55. 6	125. 9	42 19. 2	127. 0	30
20	46 41. 0	124. 6	46 05. 1	125. 8	45 28. 3	126. 9	44 50. 9	128. 0	44 12. 8	129. 1	20
10	48 38. 2	126. 8	48 00. 4	128. 0	47 22. 0	129. 1	46 42. 8	130. 2	46 03. 0	131. 3	10
2 00	50 31. 8	129. 2	49 52. 3	130. 4	49 11. 9	131. 6	48 31. 0	132. 7	47 49. 3	133. 8	2 00
1 50	52 21. 4	131. 9	51 39. 8	133. 1	50 57. 6	134. 2	50 14. 8	135. 3	49 31. 1	136. 4	1 50
40	54 06. 3	134. 8	53 22. 8	136. 0	52 38. 5	137. 1	51 53. 7	138. 1	51 08. 1	139. 2	40
30	55 45. 9	138. 0	55 00. 0	139. 1	54 13. 9	140. 2	53 26. 9	141. 2	52 39. 4	142. 3	30
20	57 19. 1	141. 4	56 31. 4	142. 5	55 42. 9	143. 6	54 54. 0	144. 6	54 04. 4	145. 6	20
10	58 45. 4	145. 2	57 55. 3	146. 2	57 04. 8	147. 2	51 13. 8	148. 2	55 22. 4	149. 1	10
1 00	60 03. 5	149. 3	59 11. 3	150. 3	58 18. 7	151. 2	57 25. 6	152. 1	56 32. 2	152. 9	1 00
0 50	61 12. 4	153. 7	60 18. 0	154. 6	59 23. 5	155. 4	58 28. 6	156. 2	57 33. 1	157. 0	0 50
40	62 10. 7	158. 5	61 14. 7	159. 3	60 18. 1	160. 0	59 21. 7	160. 6	58 24. 8	161. 2	40
30	62 57. 7	163. 6	62 00. 0	164. 2	61 01. 9	164. 7	60 04. 0	165. 2	59 05. 9	165. 7	30
20	63 32. 0	168. 9	62 33. 1	169. 3	61 34. 0	169. 7	60 35. 0	170. 1	59 35. 8	170. 4	20
10	63 53. 0	174. 4	62 53. 2	174. 6	61 53. 5	174. 8	60 53. 7	175. 0	59 53. 9	175. 2	10
0 00	64 0. 0	180. 0	63 0. 0	180. 0	62 0. 0	180. 0	61 0. 0	180. 0	60 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

56° 13.8

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 33.0	105.8	0 15.7	106.7							5 40
30	2 51.2	106.5	2 33.4	107.4	2 15.5	108.4	1 57.4	109.4	1 39.3	110.3	30
20	5 09.5	107.2	4 50.8	108.2	4 32.0	109.1	4 13.1	110.1	3 54.3	111.0	20
10	7 26.9	108.0	7 07.4	109.0	6 47.9	109.9	6 28.2	110.9	6 08.5	111.8	10
5 00	9 43.7	108.8	9 23.5	109.8	9 03.2	110.7	8 42.6	111.7	8 21.9	112.6	5 00
4 50	11 59.9	109.6	11 38.8	110.6	11 17.6	111.5	10 56.2	112.5	10 34.7	113.4	4 50
40	14 15.3	110.5	13 53.5	111.5	13 31.3	112.4	13 09.0	113.4	12 46.4	114.3	40
30	16 29.9	111.4	16 07.1	112.4	15 44.1	113.3	15 20.9	114.3	14 57.3	115.2	30
20	18 43.7	112.4	18 20.0	113.4	17 56.0	114.4	17 31.7	115.3	17 07.2	116.3	20
10	20 56.4	113.4	20 31.8	114.4	20 06.8	115.4	19 41.8	116.4	19 16.0	117.4	10
4 00	23 08.2	114.5	22 42.5	115.5	22 16.5	116.5	21 50.1	117.5	21 23.4	118.4	4 00
3 50	25 18.7	115.7	24 51.9	116.7	24 24.8	117.7	23 57.3	118.7	23 29.5	119.6	3 50
40	27 28.1	116.9	27 00.1	117.9	26 31.9	118.9	26 03.1	119.9	25 34.0	120.8	40
30	29 35.8	118.2	29 06.8	119.2	28 37.3	120.2	28 07.3	121.2	27 37.0	122.2	30
20	31 42.1	119.6	31 11.8	120.6	30 41.0	121.6	30 09.8	122.6	29 38.1	123.6	20
10	33 46.5	121.1	33 14.9	122.1	32 43.0	123.1	32 10.3	124.1	31 37.2	125.1	10
3 00	35 49.1	122.6	35 16.2	123.6	34 42.6	124.7	34 08.6	125.7	33 34.1	126.7	3 00
2 50	37 49.3	124.3	37 14.9	125.3	36 40.0	126.3	36 04.6	127.3	35 28.6	128.3	2 50
40	39 47.3	126.1	39 11.3	127.1	38 34.8	128.2	37 57.8	129.2	37 20.2	130.1	40
30	41 42.2	128.1	41 04.8	129.1	40 26.7	130.1	39 48.1	131.1	39 08.9	132.1	30
20	43 34.3	130.2	42 55.1	131.2	42 15.2	132.2	41 35.0	133.2	40 54.1	134.2	20
10	45 22.6	132.4	44 41.6	133.4	44 00.2	134.4	43 18.2	135.4	42 35.7	136.4	10
2 00	47 07.2	134.8	46 24.5	135.8	45 41.1	136.8	44 57.3	137.8	44 13.0	138.8	2 00
1 50	48 47.0	137.4	48 02.4	138.4	47 17.5	139.4	46 31.8	140.3	45 45.7	141.3	1 50
40	50 22.2	140.2	49 35.8	141.2	48 48.7	142.2	48 01.2	143.1	47 13.3	144.0	40
30	51 51.5	143.3	51 03.0	144.2	50 14.2	145.1	49 25.0	146.0	48 35.3	146.9	30
20	53 14.5	146.5	52 24.2	147.4	51 33.4	148.3	50 42.3	149.1	49 50.8	149.9	20
10	54 30.4	150.0	53 38.2	150.8	52 45.7	151.6	51 52.8	152.4	50 59.6	153.2	10
1 00	55 38.6	153.7	54 44.6	154.5	53 50.2	155.2	52 55.7	155.9	52 00.9	156.6	1 00
0 50	56 38.0	157.7	55 42.2	158.3	54 46.4	159.0	53 50.4	159.6	52 54.2	160.2	0 50
40	57 28.0	161.8	56 30.8	162.4	55 33.5	162.9	54 36.2	163.4	53 38.6	163.9	40
30	58 07.6	166.2	57 09.2	166.6	56 11.0	167.1	55 12.4	167.5	54 14.1	167.8	30
20	58 36.6	170.7	57 37.4	171.0	56 38.0	171.3	55 38.7	171.6	54 39.4	171.8	20
10	58 54.1	175.3	57 54.3	175.5	56 54.5	175.6	55 54.7	175.8	54 54.8	175.9	10
0 00	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 21.2	111.3	1 03.1	112.2	0 45.0	113.2	0 26.7	114.1	0 08.6	115.1	5 30
20	3 35.3	112.0	3 16.2	113.0	2 57.2	113.9	2 38.0	114.9	2 18.8	115.8	20
10	5 48.6	112.8	5 28.7	113.8	5 08.6	114.7	4 48.4	115.7	4 28.2	116.6	10
5 00	8 01.2	113.6	7 40.3	114.5	7 19.3	115.5	6 58.0	116.4	6 36.8	117.3	5 00
4 50	10 12.8	114.4	9 51.1	115.3	9 29.0	116.3	9 06.7	117.2	8 44.3	118.2	4 50
40	12 23.8	115.3	12 00.8	116.2	11 37.8	117.2	11 14.4	118.1	10 51.0	119.1	40
30	14 33.6	116.2	14 09.7	117.2	13 45.5	118.1	13 21.0	119.0	12 56.4	120.0	30
20	16 42.4	117.2	16 17.4	118.2	15 52.0	119.1	15 26.4	120.0	15 00.7	121.0	20
10	18 50.0	118.3	18 23.8	119.3	17 57.3	120.2	17 30.6	121.1	17 03.6	122.1	10
4 00	20 56.4	119.4	20 28.9	120.3	20 01.4	121.3	19 33.3	122.2	19 05.1	123.2	4 00
3 50	23 01.2	120.6	22 32.7	121.5	22 03.7	122.5	21 34.4	123.4	21 05.0	124.4	3 50
40	25 04.7	121.8	24 34.8	122.7	24 04.6	123.7	23 34.0	124.6	23 03.1	125.6	40
30	27 06.3	123.1	26 35.2	124.0	26 03.6	125.0	25 31.6	125.9	24 59.5	126.9	30
20	29 06.1	124.5	28 33.5	125.5	28 00.7	126.4	27 27.3	127.4	26 53.7	128.4	20
10	31 03.7	126.0	30 29.9	127.0	29 55.7	127.9	29 20.7	128.9	28 45.7	129.8	10
3 00	32 59.3	127.6	32 23.9	128.6	31 48.1	129.5	31 11.8	130.5	30 35.2	131.4	3 00
2 50	34 52.2	129.3	34 15.2	130.3	33 37.9	131.2	33 00.2	132.2	32 21.9	133.1	2 50
40	36 42.3	131.1	36 03.8	132.1	35 24.9	133.0	34 45.5	133.9	34 05.8	134.9	40
30	38 29.3	133.1	37 49.2	134.0	37 08.7	134.9	36 27.7	135.8	35 46.3	136.8	30
20	40 13.0	135.1	39 31.2	136.0	38 49.0	137.0	38 06.4	137.9	37 23.3	138.8	20
10	41 52.7	137.3	41 09.3	138.2	40 25.3	139.1	39 41.1	140.0	38 56.5	140.9	10
2 00	43 28.4	139.7	42 43.2	140.6	41 57.6	141.4	41 11.5	142.3	40 25.2	143.2	2 00
1 50	44 59.2	142.2	44 12.3	143.1	43 25.1	143.9	42 37.3	144.7	41 49.3	145.6	1 50
40	46 25.1	144.8	45 36.4	145.7	44 47.4	146.5	43 57.9	147.3	43 08.3	148.1	40
30	47 45.2	147.7	46 54.9	148.5	46 04.2	149.3	45 13.0	150.0	44 21.7	150.7	30
20	48 59.3	150.7	48 07.1	151.4	47 14.7	152.2	46 22.0	152.9	45 29.2	153.5	20
10	50 06.2	153.9	49 12.6	154.6	48 18.6	155.2	47 24.4	155.9	46 30.1	156.5	10
1 00	51 06.1	157.2	50 10.8	157.8	49 15.4	158.4	48 19.9	159.0	47 24.1	159.6	1 00
0 50	51 57.8	160.7	51 01.2	161.2	50 04.6	161.8	49 07.6	162.3	48 10.7	162.8	0 50
40	52 41.0	164.4	51 43.2	164.8	50 45.5	165.3	49 47.4	165.7	48 49.5	166.1	40
30	53 15.1	168.2	52 16.5	168.5	51 17.7	168.8	50 18.8	169.1	49 20.1	169.4	30
20	53 40.0	172.1	52 40.6	172.3	51 41.2	172.5	50 41.7	172.7	49 42.2	172.9	20
10	53 55.0	176.0	52 55.1	176.2	51 55.3	176.3	50 55.4	176.4	49 55.5	176.5	10
0 00	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 17. 5	89. 1	0 35. 1	88. 1	0 52. 7	87. 1	1 10. 1	86. 2	6 00
5 50	2 23. 4	90. 7	2 40. 9	89. 8	2 58. 4	88. 8	3 15. 9	87. 8	3 33. 2	86. 9	5 50
40	4 46. 9	91. 5	5 04. 4	90. 5	5 21. 9	89. 5	5 39. 3	88. 6	5 56. 5	87. 6	40
30	7 10. 2	92. 2	7 27. 8	91. 2	7 45. 3	90. 3	8 02. 8	89. 3	8 19. 8	88. 3	30
20	9 33. 5	93. 0	9 51. 2	92. 0	10 08. 8	91. 0	10 26. 2	90. 0	10 43. 3	89. 1	20
10	11 56. 8	93. 7	12 14. 6	92. 7	12 32. 1	91. 7	12 49. 7	90. 7	13 06. 8	89. 8	10
5 00	14 19. 7	94. 5	14 37. 8	93. 5	14 55. 6	92. 5	15 13. 0	91. 5	15 30. 2	90. 5	5 00
4 50	16 42. 8	95. 3	17 00. 9	94. 3	17 18. 8	93. 3	17 36. 4	92. 3	17 53. 6	91. 3	4 50
40	19 05. 5	96. 1	19 23. 9	95. 1	19 41. 9	94. 1	19 59. 7	93. 1	20 17. 0	92. 1	40
30	21 28. 0	96. 9	21 46. 7	95. 9	22 04. 9	94. 9	22 22. 9	93. 8	22 40. 3	92. 8	30
20	23 50. 3	97. 8	24 09. 2	96. 7	24 27. 8	95. 7	24 46. 0	94. 6	25 03. 6	93. 6	20
10	26 12. 2	98. 7	26 31. 6	97. 6	26 50. 3	96. 5	27 08. 8	95. 4	27 26. 6	94. 4	10
4 00	28 33. 9	99. 6	28 53. 6	98. 5	29 12. 8	97. 4	29 31. 5	96. 3	29 49. 6	95. 2	4 00
3 50	30 55. 1	100. 6	31 15. 2	99. 4	31 34. 8	98. 3	31 53. 9	97. 2	32 12. 2	96. 1	3 50
40	33 15. 9	101. 6	33 36. 6	100. 5	33 56. 7	99. 3	34 16. 1	98. 2	34 34. 9	97. 0	40
30	35 36. 6	102. 7	35 57. 4	101. 5	36 17. 9	100. 3	36 37. 9	99. 2	36 57. 1	98. 0	30
20	37 55. 8	103. 8	38 17. 7	102. 6	38 38. 9	101. 4	38 59. 4	100. 2	39 18. 9	99. 0	20
10	40 14. 8	105. 0	40 37. 2	103. 8	40 59. 2	102. 6	41 20. 2	101. 3	41 40. 4	100. 1	10
3 00	42 32. 9	106. 3	42 56. 2	105. 0	43 18. 9	103. 8	43 40. 7	102. 5	44 01. 4	101. 2	3 00
2 50	44 50. 0	107. 7	45 14. 4	106. 4	45 37. 8	105. 1	46 00. 2	103. 8	46 21. 8	102. 4	2 50
40	47 06. 1	109. 2	47 31. 5	107. 9	47 55. 9	106. 5	48 19. 3	105. 1	48 41. 5	103. 7	40
30	49 20. 8	110. 9	49 47. 2	109. 5	50 12. 8	108. 1	50 37. 1	106. 6	51 00. 4	105. 2	30
20	51 34. 1	112. 7	52 01. 8	111. 2	52 28. 6	109. 8	52 54. 1	108. 3	53 18. 4	106. 8	20
10	53 44. 5	114. 7	54 14. 6	113. 2	54 42. 6	111. 6	55 09. 5	110. 1	55 35. 1	108. 5	10
2 00	55 54. 8	116. 9	56 25. 5	115. 3	56 55. 1	113. 7	57 23. 5	112. 1	57 50. 4	110. 4	2 00
1 50	58 01. 2	119. 3	58 33. 9	117. 8	59 05. 0	116. 1	59 35. 2	114. 4	60 03. 6	112. 6	1 50
40	60 04. 7	122. 1	60 39. 3	120. 4	61 12. 6	118. 7	61 44. 7	117. 0	62 14. 9	115. 1	40
30	62 04. 0	125. 2	62 41. 0	123. 5	63 16. 4	121. 7	63 50. 6	119. 9	64 23. 2	118. 0	30
20	63 58. 7	128. 8	64 38. 0	127. 0	65 16. 3	125. 2	65 53. 0	123. 3	66 28. 1	121. 3	20
10	65 47. 2	132. 8	66 29. 6	131. 0	67 10. 5	129. 2	67 50. 0	127. 2	68 28. 1	125. 2	10
1 00	67 28. 5	137. 5	68 13. 8	135. 8	68 58. 0	133. 9	69 40. 8	131. 9	70 22. 0	129. 8	1 00
0 50	69 00. 5	142. 8	69 49. 0	141. 2	70 36. 4	139. 3	71 22. 8	137. 4	72 07. 6	135. 3	0 50
40	70 21. 1	148. 9	71 13. 0	147. 4	72 03. 9	145. 7	72 53. 9	143. 8	73 42. 9	141. 9	40
30	71 27. 8	155. 8	72 22. 8	154. 5	73 17. 0	153. 0	74 11. 0	151. 4	75 03. 8	149. 7	30
20	72 18. 0	163. 4	73 15. 7	162. 4	74 12. 9	161. 3	75 09. 8	160. 1	76 06. 3	158. 8	20
10	72 49. 3	171. 5	73 48. 7	171. 0	74 48. 0	170. 4	75 47. 2	169. 8	76 46. 3	169. 0	10
0 00	73 0. 0	180. 0	74 0. 0	180. 0	75 0. 0	180. 0	76 0. 0	180. 0	77 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 15.6	80.7	6 10
6 00	1 27.6	85.2	1 45.0	84.3	2 02.5	83.3	2 19.9	82.4	2 37.3	81.4	6 00
5 50	3 50.6	85.9	4 07.9	85.0	4 25.1	84.0	4 42.2	83.1	4 59.2	82.1	5 50
40	6 13.7	86.6	6 30.9	85.7	6 47.8	84.7	7 04.7	83.8	7 21.4	82.8	40
30	8 37.0	87.4	8 53.9	86.4	9 10.7	85.4	9 27.3	84.5	9 43.9	83.5	30
20	11 00.3	88.1	11 17.1	87.1	11 33.8	86.1	11 50.2	85.2	12 06.4	84.2	20
10	13 23.7	88.8	13 40.5	87.8	13 56.9	86.8	14 13.2	85.8	14 29.3	84.8	10
5 00	15 47.1	89.5	16 03.8	88.5	16 20.2	87.5	16 36.4	86.5	16 52.2	85.5	5 00
4 50	18 10.6	90.2	18 27.2	89.2	18 43.6	88.2	18 59.6	87.2	19 15.3	86.2	4 50
40	20 34.0	91.0	20 50.7	90.0	21 07.0	88.9	21 22.9	87.9	21 38.5	86.9	40
30	22 57.4	91.8	23 14.1	90.7	23 30.4	89.7	23 46.2	88.6	24 01.7	87.5	30
20	25 20.7	92.5	25 37.5	91.5	25 53.8	90.4	26 09.7	89.3	26 25.1	88.2	20
10	27 44.0	93.3	28 00.9	92.2	28 17.3	91.1	28 33.1	90.0	28 48.4	88.9	10
4 00	30 07.1	94.1	30 24.2	93.0	30 40.7	91.9	30 56.6	90.8	31 11.9	89.7	4 00
3 50	32 30.2	95.0	32 47.5	93.8	33 04.0	92.7	33 20.0	91.5	33 35.3	90.4	3 50
40	34 53.0	95.9	35 10.4	94.7	35 27.2	93.5	35 43.3	92.3	35 58.7	91.1	40
30	37 15.6	96.8	37 33.2	95.6	37 50.3	94.4	38 06.5	93.2	38 22.0	91.9	30
20	39 37.8	97.8	39 55.9	96.5	40 13.3	95.3	40 29.8	94.0	40 45.5	92.7	20
10	41 59.8	98.8	42 18.3	97.5	42 36.0	96.2	42 52.9	94.9	43 08.7	93.6	10
3 00	44 21.3	99.9	44 40.4	98.6	44 58.5	97.2	45 15.7	95.8	45 31.8	94.5	3 00
2 50	46 42.5	101.1	47 02.0	99.7	47 20.7	98.3	47 38.2	96.8	47 54.6	95.4	2 50
40	49 02.9	102.3	49 23.1	100.8	49 42.4	99.4	50 00.4	97.9	50 17.3	96.4	40
30	51 22.7	103.7	51 43.7	102.2	52 03.7	100.7	52 22.2	99.1	52 39.7	97.5	30
20	53 41.5	105.2	54 03.5	103.6	54 24.3	102.0	54 43.7	100.4	55 01.7	98.7	20
10	55 59.5	106.9	56 22.5	105.2	56 44.2	103.5	57 04.4	101.8	57 23.2	100.0	10
2 00	58 16.0	108.7	58 40.3	107.0	59 03.2	105.2	59 24.5	103.4	59 44.2	101.5	2 00
1 50	60 31.0	110.8	60 56.8	109.0	61 20.9	107.1	61 43.4	105.2	62 04.4	103.1	1 50
40	62 44.0	113.2	63 11.3	111.3	63 37.2	109.2	64 01.4	107.2	64 23.5	105.0	40
30	64 54.4	116.0	65 23.9	113.9	65 51.5	111.7	66 17.5	109.5	66 41.3	107.2	30
20	67 01.6	119.2	67 33.4	117.0	68 03.5	114.7	68 31.5	112.3	68 57.3	109.8	20
10	69 04.5	123.0	69 39.1	120.7	70 12.0	118.2	70 42.6	115.7	71 10.8	113.0	10
1 00	71 01.7	127.5	71 39.6	125.1	72 15.8	122.5	72 49.6	119.8	73 21.2	116.9	1 00
0 50	72 51.2	133.0	73 33.2	130.5	74 13.0	127.7	74 50.8	124.9	75 26.4	121.8	0 50
40	74 30.5	139.6	75 16.7	137.2	76 01.2	134.5	76 43.8	131.5	77 23.9	128.1	40
30	75 55.8	147.7	76 46.5	145.4	77 36.0	142.9	78 24.0	140.0	79 10.0	136.7	30
20	77 02.3	157.2	77 57.6	155.4	78 52.2	153.4	79 45.8	150.9	80 38.0	148.1	20
10	77 45.2	168.2	78 43.8	167.2	79 42.3	166.0	80 40.7	164.5	81 38.2	162.8	10
0 00	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 33.3	79.7	0 50.9	78.8	1 08.8	77.8	1 26.4	76.8	1 44.0	75.9	6 10
6 00	2 54.6	80.4	3 11.8	79.5	3 29.1	78.5	3 46.2	77.5	4 03.4	76.6	6 00
5 50	5 16.2	81.1	5 33.0	80.2	5 49.9	79.2	6 06.5	78.2	6 23.1	77.3	5 50
40	7 38.1	81.8	7 54.5	80.9	8 10.9	79.9	8 27.1	78.9	8 43.2	77.9	40
30	10 00.1	82.5	10 16.2	81.5	10 32.2	80.5	10 48.1	79.6	11 03.7	78.6	30
20	12 22.5	83.2	12 38.3	82.2	12 53.9	81.2	13 09.2	80.2	13 24.4	79.2	20
10	14 45.0	83.8	15 00.5	82.8	15 15.8	81.8	15 30.8	80.8	15 45.6	79.8	10
5 00	17 07.7	84.5	17 22.9	83.5	17 37.9	82.5	17 52.5	81.5	18 06.8	80.4	5 00
4 50	19 30.5	85.2	19 45.5	84.1	20 00.2	83.1	20 14.4	82.1	20 28.2	81.0	4 50
40	21 53.6	85.8	22 08.3	84.8	22 22.7	83.7	22 36.6	82.7	22 50.1	81.6	40
30	24 16.8	86.5	24 31.2	85.4	24 45.4	84.3	24 59.1	83.3	25 12.1	82.2	30
20	26 39.9	87.2	26 54.3	86.1	27 08.2	85.0	27 21.5	83.9	27 34.4	82.8	20
10	29 03.2	87.8	29 17.4	86.7	29 31.2	85.6	29 44.2	84.5	29 56.7	83.4	10
4 00	31 26.6	88.5	31 40.7	87.4	31 54.2	86.2	32 07.1	85.1	32 19.3	83.9	4 00
3 50	33 50.0	89.2	34 03.9	88.0	34 17.4	86.9	34 30.1	85.7	34 42.0	84.5	3 50
40	36 13.5	89.9	36 27.4	88.7	36 40.7	87.5	36 53.1	86.3	37 04.9	85.1	40
30	38 36.9	90.7	38 50.8	89.4	39 04.0	88.2	39 16.3	86.9	39 27.9	85.6	30
20	41 00.4	91.4	41 14.3	90.1	41 27.4	88.9	41 39.6	87.9	41 50.9	86.2	20
10	43 23.6	92.2	43 37.7	90.9	43 50.8	89.6	44 03.0	88.2	44 14.1	86.8	10
3 00	45 47.0	93.1	46 01.1	91.7	46 14.3	90.3	46 26.3	88.9	46 37.4	87.4	3 00
2 50	48 10.1	94.0	48 24.5	92.5	48 37.7	91.1	48 49.8	89.6	49 00.7	88.1	2 50
40	50 33.2	94.9	50 47.7	93.4	51 01.2	91.9	51 13.2	90.3	51 24.1	88.7	40
30	52 55.9	95.9	53 10.9	94.3	53 24.4	92.7	53 36.2	91.1	53 47.4	89.4	30
20	55 18.6	97.0	55 33.8	95.3	55 47.7	93.6	56 00.0	91.9	56 10.9	90.1	20
10	57 40.6	98.2	57 56.4	96.4	58 10.9	94.6	58 23.2	92.8	58 34.4	90.9	10
2 00	60 02.4	99.6	60 18.8	97.7	60 33.7	95.7	60 46.6	93.7	60 57.8	91.7	2 00
1 50	62 23.4	101.1	62 40.7	99.0	62 56.4	96.9	63 09.5	94.8	63 21.1	92.6	1 50
40	64 43.8	102.9	65 02.1	100.6	65 18.4	98.3	65 32.4	96.0	65 44.5	93.6	40
30	67 03.2	104.9	67 22.7	102.4	67 40.2	99.9	67 55.0	97.3	68 07.5	94.7	30
20	69 21.0	107.2	69 42.1	104.6	70 00.9	101.8	70 17.0	98.9	70 30.4	96.1	20
10	71 37.0	110.1	72 00.3	107.2	72 20.7	104.1	72 38.2	100.9	72 52.5	97.7	10
1 00	73 50.0	113.7	74 15.9	110.5	74 38.9	107.0	74 58.5	103.4	75 14.5	99.7	1 00
0 50	75 59.0	118.3	76 28.8	114.7	76 54.8	110.8	77 17.0	106.7	77 35.0	102.1	0 50
40	78 01.5	124.5	78 35.8	120.5	79 06.6	116.0	79 32.8	111.0	79 54.6	105.9	40
30	79 53.5	132.9	80 34.0	128.6	81 11.5	123.6	81 43.5	117.9	82 10.5	111.5	30
20	81 28.6	144.6	82 17.0	140.4	83 02.4	135.3	83 43.7	129.0	84 19.4	121.2	20
10	82 35.4	160.5	83 31.7	157.7	84 26.7	153.9	85 19.6	148.5	86 09.1	140.9	10
0 00	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20			0 01.6	73.2	0 19.8	72.3	0 38.1	71.4	0 56.3	70.4	6 20
10	2 01.7	74.9	2 19.2	74.0	2 36.8	73.0	2 54.2	72.1	3 11.7	71.1	10
6 00	4 20.4	75.6	4 37.3	74.7	4 54.2	73.7	5 11.0	72.8	5 27.7	71.8	6 00
5 50	6 39.6	76.3	6 55.9	75.3	7 12.1	74.4	7 28.2	73.4	7 44.2	72.4	5 50
40	8 59.1	77.0	9 14.9	76.0	9 30.5	75.0	9 45.9	74.0	10 01.2	73.0	40
30	11 19.0	77.6	11 34.2	76.6	11 49.2	75.6	12 04.0	74.6	12 18.7	73.6	30
20	13 39.3	78.2	13 54.0	77.2	14 08.4	76.2	14 22.6	75.2	14 36.5	74.2	20
10	15 59.9	78.8	16 14.0	77.8	16 27.9	76.8	16 41.4	75.8	16 54.7	74.8	10
5 00	18 20.7	79.4	18 34.4	78.4	18 47.7	77.4	19 00.6	76.3	19 13.3	75.3	5 00
4 50	20 41.9	80.0	20 55.0	78.9	21 07.8	77.9	21 20.1	76.9	21 32.2	75.8	4 50
40	23 03.2	80.6	23 15.9	79.5	23 28.2	78.4	23 40.0	77.4	23 51.4	76.3	40
30	25 24.8	81.1	25 37.1	80.0	25 48.9	78.9	26 00.0	77.9	26 10.9	76.8	30
20	27 46.7	81.7	27 58.5	80.6	28 09.7	79.4	28 20.5	78.3	28 30.6	77.2	20
10	30 08.8	82.2	30 20.1	81.1	30 30.8	79.9	30 40.9	78.8	30 50.7	77.7	10
4 00	32 31.0	82.8	32 41.9	81.6	32 52.2	80.4	33 01.9	79.3	33 10.9	78.1	4 00
3 50	34 53.4	83.3	35 03.8	82.1	35 13.8	80.9	35 22.8	79.7	35 31.4	78.5	3 50
40	37 15.8	83.8	37 26.1	82.6	37 35.5	81.3	37 44.1	80.1	37 52.0	78.8	40
30	39 38.6	84.4	39 48.4	83.1	39 57.4	81.8	40 05.4	80.5	40 12.8	79.2	30
20	42 01.3	84.9	42 10.9	83.6	42 19.5	82.2	42 27.1	80.9	42 33.8	79.6	20
10	44 24.4	85.4	44 33.5	84.1	44 41.6	82.7	44 48.7	81.3	44 54.9	79.9	10
3 00	46 47.4	86.0	46 56.3	84.6	47 04.0	83.1	47 10.6	81.6	47 16.2	80.2	3 00
2 50	49 10.6	86.6	49 19.0	85.0	49 26.4	83.5	49 32.5	82.0	49 37.6	80.5	2 50
40	51 33.7	87.1	51 42.1	85.5	51 49.0	83.9	51 54.8	82.3	51 59.1	80.7	40
30	53 57.1	87.7	54 05.0	86.0	54 11.8	84.3	54 16.8	82.6	54 20.7	80.9	30
20	56 20.4	88.3	56 28.2	86.5	56 34.5	84.7	56 39.3	82.9	56 42.4	81.1	20
10	58 43.9	89.0	58 51.4	87.1	58 57.4	85.1	59 01.5	83.2	59 04.2	81.3	10
2 00	61 07.2	89.7	61 14.7	87.6	61 20.4	85.5	61 24.1	83.5	61 25.9	81.4	2 00
1 50	63 30.6	90.4	63 38.0	88.2	63 43.4	85.9	63 46.5	83.7	63 47.7	81.4	1 50
40	65 54.1	91.2	66 01.6	88.8	66 06.6	86.3	66 09.3	83.8	66 09.7	81.4	40
30	68 17.5	92.1	68 24.8	89.4	68 29.7	86.7	68 31.8	83.9	68 31.2	81.2	30
20	70 40.8	93.1	70 48.4	90.1	70 52.9	87.1	70 54.5	84.0	70 53.2	80.9	20
10	73 03.0	94.3	73 11.8	90.9	73 16.2	87.4	73 17.0	84.0	73 14.7	80.5	10
1 00	75 26.8	95.8	75 35.1	91.8	75 39.4	87.8	75 39.8	83.8	75 36.1	79.7	1 00
0 50	77 49.5	97.7	77 58.4	93.0	78 03.0	88.2	78 02.4	83.4	77 56.5	78.6	0 50
40	80 10.9	100.3	80 21.6	94.5	80 26.2	88.5	80 24.7	82.6	80 17.0	76.6	40
30	82 31.5	104.5	82 44.5	96.8	82 49.8	88.9	82 46.0	81.0	82 35.5	73.2	30
20	84 47.6	111.9	85 06.2	101.1	85 13.1	89.3	85 07.6	77.4	84 50.5	66.4	20
10	86 52.4	129.4	87 24.2	112.3	87 36.4	89.6	87 24.9	66.9	86 53.6	49.5	10
0 00	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 16.7	64.9	6 30
20	1 14.6	69.4	1 32.7	68.5	1 50.9	67.5	2 09.0	66.6	2 27.1	65.6	20
10	3 29.1	70.1	3 46.5	69.2	4 03.8	68.2	4 20.9	67.3	4 38.1	66.3	10
6 00	5 44.3	70.8	6 00.9	69.9	6 17.3	68.9	6 33.6	67.9	6 49.8	66.9	6 00
5 50	8 00.0	71.4	8 15.8	70.5	8 31.3	69.5	8 46.7	68.5	9 02.1	67.5	5 50
40	10 16.2	72.1	10 31.2	71.1	10 45.9	70.1	11 00.6	69.1	11 14.9	68.1	40
30	12 32.8	72.6	12 47.1	71.6	13 01.0	70.6	13 14.7	69.6	13 28.2	68.6	30
20	14 50.1	73.2	15 03.5	72.2	15 16.6	71.2	15 29.5	70.2	15 42.0	69.1	20
10	17 07.6	73.7	17 20.2	72.7	17 32.7	71.7	17 44.6	70.7	17 56.3	69.6	10
5 00	19 25.5	74.3	19 37.5	73.2	19 49.0	72.2	20 00.2	71.1	20 11.0	70.1	5 00
4 50	21 43.7	74.7	21 54.8	73.7	22 05.7	72.6	22 16.0	71.6	22 26.1	70.5	4 50
40	24 02.3	75.2	24 12.8	74.1	24 22.7	73.1	24 32.3	72.0	24 41.4	70.9	40
30	26 21.0	75.7	26 30.8	74.6	26 40.1	73.5	26 48.8	72.4	26 57.1	71.3	30
20	28 40.2	76.1	28 49.3	75.0	28 57.8	73.8	29 05.7	72.7	29 13.0	71.6	20
10	30 59.5	76.5	31 07.9	75.3	31 15.7	74.2	31 22.7	73.0	31 29.2	71.9	10
4 00	33 19.2	76.9	33 26.9	75.7	33 33.7	74.5	33 40.1	73.3	33 45.6	72.1	4 00
3 50	35 38.9	77.2	35 45.9	76.0	35 52.1	74.8	35 57.5	73.6	36 02.2	72.3	3 50
40	37 59.0	77.6	38 05.2	76.3	38 10.6	75.1	38 15.3	73.8	38 19.0	72.5	40
30	40 19.1	77.9	40 24.7	76.6	40 29.2	75.3	40 33.0	74.0	40 35.8	72.7	30
20	42 39.4	78.2	42 44.3	76.8	42 48.0	75.5	42 51.0	74.1	42 52.8	72.8	20
10	45 00.0	78.4	45 04.1	77.0	45 07.1	75.6	45 08.9	74.2	45 09.8	72.8	10
3 00	47 20.6	78.7	47 23.9	77.2	47 25.9	75.7	47 27.1	74.3	47 26.9	72.8	3 00
2 50	49 41.1	78.9	49 43.7	77.4	49 45.0	75.8	49 45.0	74.3	49 43.9	72.7	2 50
40	52 02.1	79.1	52 03.9	77.4	52 04.1	75.8	52 03.1	74.2	52 00.8	72.6	40
30	54 22.9	79.2	54 23.7	77.5	54 23.1	75.7	54 21.0	74.0	54 17.5	72.3	30
20	56 43.8	79.3	56 43.9	77.5	56 42.1	75.6	56 39.0	73.8	56 34.1	72.0	20
10	59 04.7	79.3	59 03.9	77.4	59 01.1	75.4	58 56.6	73.5	58 50.4	71.5	10
2 00	61 25.8	79.2	61 23.8	77.2	61 19.8	75.1	61 14.0	73.0	61 06.3	71.0	2 00
1 50	63 46.6	79.1	63 43.5	76.9	63 38.4	74.6	63 31.0	72.4	63 21.5	70.2	1 50
40	66 07.6	78.9	66 03.2	76.4	65 56.3	74.0	65 47.3	71.6	65 36.0	69.2	40
30	68 28.1	78.5	68 22.4	75.8	68 14.0	73.1	68 02.9	70.5	67 49.6	67.9	30
20	70 48.7	77.9	70 41.3	74.9	70 30.7	71.9	70 17.6	69.0	70 01.6	66.2	20
10	73 08.5	77.0	72 59.2	73.7	72 46.6	70.3	72 30.7	67.1	72 11.7	64.0	10
1 00	75 28.1	75.8	75 16.4	71.9	75 00.6	68.2	74 41.6	64.5	74 19.1	61.0	1 00
0 50	77 46.5	73.9	77 31.5	69.3	77 12.5	65.0	76 49.0	60.9	76 22.2	57.1	0 50
40	80 03.4	70.9	79 44.2	65.5	79 20.1	60.5	78 51.4	55.8	78 18.8	51.5	40
30	82 17.0	66.0	81 51.5	59.4	80 21.0	53.5	80 45.0	48.4	80 05.0	43.9	30
20	84 23.4	56.9	83 48.4	49.0	83 07.7	42.5	82 22.7	37.2	81 34.8	32.9	20
10	86 10.6	37.9	85 21.2	30.2	84 28.3	24.8	83 33.4	21.0	82 37.1	18.1	10
0 00	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	84 0.0	0.0	83 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 23.4	90.7	2 05.8	91.7	1 48.3	92.6	1 30.6	93.6	1 12.9	94.6	5 50
40	4 46.9	91.5	4 29.2	92.4	4 11.5	93.4	3 53.7	94.4	3 35.8	95.3	40
30	7 10.2	92.2	6 52.5	93.2	6 34.6	94.1	6 16.7	95.1	5 58.5	96.0	30
20	9 33.5	93.0	9 15.7	93.9	8 57.6	94.9	8 39.5	95.9	8 21.1	96.8	20
10	11 56.8	93.7	11 38.8	94.7	11 20.4	95.7	11 02.1	96.7	10 43.5	97.6	10
5 00	14 19.7	94.5	14 01.6	95.5	13 43.1	96.4	13 24.4	97.4	13 05.5	98.4	5 00
4 50	16 42.8	95.3	16 24.2	96.3	16 05.5	97.2	15 46.6	98.2	15 27.2	99.2	4 50
40	19 05.5	96.1	18 46.8	97.1	18 27.7	98.1	18 08.4	99.1	17 48.7	100.1	40
30	21 28.0	96.9	21 09.0	97.9	20 49.5	98.9	20 29.9	99.9	20 09.8	101.0	30
20	23 50.3	97.8	23 30.9	98.8	23 11.1	99.8	22 51.0	100.8	22 30.4	101.9	20
10	26 12.2	98.7	25 52.5	99.7	25 32.2	100.7	25 11.6	101.8	24 50.4	102.8	10
4 00	28 33.9	99.6	28 13.7	100.7	27 53.0	101.7	27 31.7	102.8	27 10.0	103.8	4 00
3 50	30 55.1	100.6	30 34.4	101.7	30 13.0	102.7	29 51.3	103.8	29 28.9	104.9	3 50
40	33 15.9	101.6	32 54.6	102.7	32 32.8	103.8	32 10.3	104.9	31 47.3	106.0	40
30	35 36.6	102.7	35 14.3	103.8	34 51.8	104.9	34 28.7	106.1	34 04.8	107.2	30
20	37 55.8	103.8	37 33.2	105.0	37 09.9	106.1	36 46.1	107.3	36 21.3	108.4	20
10	40 14.8	105.0	39 51.4	106.2	39 17.3	107.4	39 02.6	108.6	38 37.0	109.7	10
3 00	42 32.9	106.3	42 08.7	107.5	41 43.7	108.8	41 17.9	110.0	40 51.4	111.2	3 00
2 50	44 50.0	107.7	44 24.9	108.9	43 58.9	110.2	43 32.1	111.5	43 04.4	112.7	2 50
40	47 06.1	109.2	46 40.0	110.5	46 12.8	111.8	45 44.9	113.1	45 16.0	114.4	40
30	49 20.8	110.9	48 53.5	112.2	48 25.1	113.5	47 55.9	114.9	47 25.8	116.2	30
20	51 34.1	112.7	51 05.4	114.1	50 35.8	115.4	50 05.1	116.8	49 33.4	118.1	20
10	53 45.5	114.7	53 15.4	116.1	52 44.1	117.5	52 11.9	118.9	51 38.6	120.3	10
2 00	55 54.8	116.9	55 22.9	118.4	54 50.0	119.8	54 16.2	121.2	53 41.1	122.6	2 00
1 50	58 01.2	119.3	57 27.6	120.9	56 52.8	122.4	56 17.0	123.9	55 40.1	125.3	1 50
40	60 04.7	122.1	59 29.0	123.7	58 52.1	125.2	58 14.1	126.7	57 35.1	128.1	40
30	62 04.0	125.2	61 26.1	126.9	60 46.9	128.4	60 06.8	129.9	59 25.5	131.4	30
20	63 58.7	128.8	63 18.1	130.5	62 36.6	132.0	61 53.9	133.5	61 10.2	135.0	20
10	65 47.2	132.8	65 04.2	134.5	64 19.8	136.1	63 34.4	137.6	62 48.2	139.0	10
1 00	67 28.5	137.5	66 42.3	139.1	65 55.1	140.7	65 06.9	142.1	64 17.9	143.5	1 00
0 50	69 00.5	142.8	68 11.2	144.4	67 20.9	145.8	66 30.0	147.2	65 38.2	148.5	0 50
40	70 21.1	148.9	69 28.7	150.3	68 35.5	151.6	67 41.9	152.8	66 47.6	153.9	40
30	71 27.8	155.8	70 32.5	156.9	69 36.5	158.0	68 40.5	159.0	67 43.9	159.9	30
20	72 18.0	163.4	71 20.2	164.2	70 22.2	165.0	69 24.1	165.7	68 25.6	166.3	20
10	72 49.3	171.5	71 50.0	172.0	70 50.5	172.4	69 50.9	172.8	68 51.4	173.1	10
0 00	73 0.0	180.0	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 55.2	95.5	0 37.6	96.5	0 19.8	97.4	0 02.1	98.4			5 50
40	3 17.9	96.3	2 59.9	97.2	2 41.9	98.2	2 23.9	99.1	2 05.8	100.1	40
30	5 40.4	97.0	5 22.2	98.0	5 03.8	98.9	5 45.3	99.9	4 26.9	100.8	30
20	8 02.6	97.8	7 44.0	98.7	7 25.4	99.7	7 06.5	100.7	6 47.5	101.6	20
10	10 24.6	98.6	10 05.8	99.5	9 46.6	100.5	9 27.3	101.5	9 07.9	102.4	10
5 00	12 46.3	99.4	12 27.0	100.3	12 07.4	101.3	11 47.7	102.3	11 27.7	103.2	5 00
4 50	15 07.7	100.2	14 47.9	101.2	14 27.9	102.2	14 07.6	103.1	13 47.2	104.1	4 50
40	17 28.6	101.1	17 08.4	102.0	16 47.9	103.0	16 27.1	104.0	16 06.0	105.0	40
30	19 49.2	102.0	19 28.4	102.9	19 07.3	103.9	18 45.9	104.9	18 24.3	105.9	30
20	22 09.3	102.9	21 48.0	103.9	21 26.3	104.9	21 04.3	105.9	20 41.8	106.9	20
10	24 28.9	103.9	24 06.9	104.9	23 44.6	105.9	23 21.8	106.9	22 58.8	107.9	10
4 00	26 47.8	104.9	26 25.2	105.9	26 02.3	106.9	25 38.8	108.0	25 14.8	109.0	4 00
3 50	29 06.2	106.0	28 42.9	107.0	28 19.1	108.0	27 54.8	109.1	27 30.1	110.1	3 50
40	31 23.7	107.1	30 59.6	108.1	30 35.0	109.2	30 09.9	110.3	29 44.2	111.3	40
30	33 40.4	108.3	33 15.4	109.3	32 49.9	110.4	32 23.8	111.5	31 57.3	112.6	30
20	35 56.1	109.5	35 30.2	110.6	35 03.8	111.7	34 36.8	112.8	34 09.1	113.9	20
10	38 10.8	110.8	37 43.9	112.0	37 16.4	113.1	36 48.4	114.3	36 19.7	115.4	10
3 00	40 24.1	112.3	39 56.2	113.5	39 27.6	114.6	38 58.3	115.8	38 28.3	116.9	3 00
2 50	42 36.1	113.9	42 07.0	115.1	41 37.2	116.2	41 06.6	117.4	40 35.4	118.5	2 50
40	44 46.3	115.6	44 15.9	116.8	43 44.9	118.0	43 12.9	119.2	42 40.3	120.3	40
30	46 54.8	117.4	46 22.9	118.7	45 50.4	119.9	45 17.0	121.1	44 43.0	122.2	30
20	49 00.9	119.4	48 27.6	120.7	47 53.6	121.9	47 18.7	123.1	46 42.9	124.3	20
10	51 04.6	121.6	50 29.6	122.9	49 53.8	124.1	49 17.2	125.4	48 39.9	126.6	10
2 00	53 05.2	124.0	52 28.4	125.3	51 50.9	126.5	51 12.6	127.8	50 33.3	129.0	2 00
1 50	55 02.4	126.6	54 23.6	127.9	53 44.0	129.2	53 03.8	130.5	52 22.8	131.7	1 50
40	56 55.2	129.5	56 14.4	130.9	55 32.9	132.1	54 50.7	133.4	54 07.5	134.6	40
30	58 43.4	132.8	58 00.4	134.1	57 16.5	135.3	56 32.1	136.6	55 46.9	137.8	30
20	60 25.6	136.4	59 40.2	137.7	58 54.3	138.9	58 07.5	140.1	57 20.0	141.3	20
10	62 01.0	140.3	61 13.2	141.6	60 24.9	142.8	59 35.8	144.0	58 46.1	145.1	10
1 00	63 28.3	144.8	62 38.0	146.0	61 47.3	147.1	60 55.9	148.2	60 04.0	149.2	1 00
0 50	64 46.1	149.6	63 53.5	150.7	63 00.3	151.8	62 06.6	152.8	61 12.8	153.7	0 50
40	65 52.9	154.9	64 57.8	155.9	64 02.6	156.8	63 06.9	157.7	62 10.9	158.4	40
30	66 47.2	160.7	65 50.0	161.5	64 52.8	162.2	63 55.4	162.9	62 57.9	163.5	30
20	67 27.0	166.9	66 28.4	167.5	65 29.7	167.9	64 30.9	168.4	63 32.0	168.9	20
10	67 51.8	173.4	66 52.1	173.7	65 52.5	173.9	64 52.7	174.2	63 53.0	174.4	10
0 00	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 47.7	101.0	1 29.5	102.0	1 11.3	102.9	0 53.1	103.9	0 34.9	104.8	5 40
30	4 08.2	101.8	3 49.6	102.8	3 30.9	103.7	3 12.1	104.7	2 53 2	105.6	30
20	6 28.5	102.6	6 09.3	103.5	5 50.1	104.5	5 30.6	105.4	5 11.2	106.4	20
10	8 48.2	103.4	8 28.5	104.3	8 08.8	105.3	7 48.6	106.2	7 28.5	107.2	10
5 00	11 07.6	104.2	10 47.3	105.1	10 26.8	106.1	10 06.1	107.1	9 45.3	108.0	5 00
4 50	13 26.3	105.1	13 05.4	106.0	12 44.3	107.0	12 22.9	108.0	12 01.3	108.9	4 50
40	15 44.6	106.0	15 23.0	106.9	15 01.1	107.9	14 39.0	108.9	14 16.7	109.8	40
30	18 02.2	106.9	17 39.9	107.8	17 17.3	108.8	16 54.5	109.8	16 31.1	110.8	30
20	20 19.1	107.9	19 56.0	108.8	19 32.7	109.8	19 08.9	110.8	18 44.9	111.8	20
10	22 35.2	108.9	22 11.2	109.9	21 47.2	110.9	21 22.4	111.9	20 57.6	112.9	10
4 00	24 50.5	110.0	24 25.8	111.0	24 00.7	112.0	23 35.2	113.0	23 09.3	114.0	4 00
3 50	27 04.9	111.1	26 39.1	112.1	26 13.2	113.2	25 46.7	114.2	25 19.8	115.2	3 50
40	29 18.1	112.3	28 51.5	113.3	28 24.5	114.4	27 57.0	115.4	27 29.0	116.4	40
30	31 30.2	113.6	31 02.5	114.6	30 34.4	115.7	30 05.5	116.7	29 36.8	117.7	30
20	33 41.0	115.0	33 12.3	116.0	32 43.0	117.1	32 13.2	118.1	31 43.0	119.1	20
10	35 50.2	116.5	35 20.3	117.5	34 49.8	118.6	34 18.9	119.6	33 47.3	120.6	10
3 00	37 57.8	118.0	37 26.7	119.0	36 55.0	120.1	36 22.6	121.2	35 49.8	122.2	3 00
2 50	40 03.4	119.6	39 31.1	120.7	38 58.0	121.8	38 24.3	122.9	37 50.1	123.9	2 50
40	42 07.1	121.4	41 33.2	122.5	40 58.8	123.6	40 23.6	124.7	39 47.9	125.7	40
30	44 08.2	123.3	43 32.9	124.5	42 56.8	125.6	42 20.2	126.7	41 42.8	127.7	30
20	46 06.7	125.4	45 29.7	126.6	44 52.0	127.7	44 13.7	128.8	43 34.7	129.8	20
10	48 01.8	127.7	47 23.1	128.9	46 43.8	130.0	46 03.7	131.1	45 23.2	132.1	10
2 00	49 53.6	130.2	49 13.0	131.3	48 31.8	132.4	47 50.0	133.5	47 07.6	134.5	2 00
1 50	51 40.9	132.8	50 58.4	134.0	50 15.6	135.1	49 31.7	136.1	48 47.5	137.1	1 50
40	53 23.7	135.7	52 39.3	136.8	51 54.3	137.9	51 08.6	139.0	50 22.5	140.0	40
30	55 01.0	138.9	54 14.5	140.0	53 27.5	141.1	52 39.9	142.1	51 51.8	143.1	30
20	56 32.0	142.4	55 43.4	143.4	54 54.4	144.4	54 04.8	145.4	53 14.8	146.3	20
10	57 55.9	146.1	57 05.3	147.1	56 14.1	148.1	54 22.6	149.0	54 30.5	149.8	10
1 00	59 11.8	150.2	58 19.0	151.1	57 25.9	152.0	56 32.5	152.8	55 38.7	153.6	1 00
0 50	60 18.3	154.5	59 23.7	155.3	58 28.7	156.1	57 33.5	156.9	56 37.9	157.7	0 50
40	61 14.9	159.2	60 18.3	159.9	59 21.8	160.5	58 24.9	161.2	57 28.0	161.8	40
30	62 00.0	164.1	61 02.0	164.7	60 04.1	165.2	59 05.8	165.6	58 07.6	166.1	30
20	62 33.1	169.3	61 34.1	169.7	60 35.0	170.0	59 35.8	170.3	58 36.6	170.7	20
10	62 53.3	174.6	61 53.5	174.8	60 53.7	175.0	59 53.9	175.1	58 54.1	175.3	10
0 00	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 16.6	105.8									5 40
30	2 34.4	106.5	2 15.5	107.5	1 56.5	108.4	1 37.5	109.4	1 18.5	110.3	30
20	4 51.6	107.3	4 32.0	108.3	4 12.3	109.2	3 52.5	110.2	3 32.7	111.1	20
10	7 08.2	108.1	6 47.9	109.1	6 27.4	110.0	6 06.8	111.0	5 46.2	111.9	10
5 00	9 24.3	109.0	9 03.2	109.9	8 41.8	110.9	8 20.4	111.8	7 58.9	112.7	5 00
4 50	11 39.5	109.9	11 17.6	110.8	10 55.5	111.8	10 33.1	112.7	10 10.7	113.6	4 50
40	13 54.1	110.8	13 31.3	111.7	13 08.3	112.7	12 45.1	113.6	12 21.7	114.6	40
30	16 07.8	111.8	15 44.1	112.7	15 20.1	113.7	14 56.0	114.6	14 31.6	115.5	30
20	18 20.6	112.7	17 56.0	113.7	17 31.1	114.7	17 05.9	115.6	16 40.5	116.5	20
10	20 32.4	113.8	20 06.8	114.8	19 40.8	115.8	19 14.7	116.7	18 48.2	117.6	10
4 00	22 43.1	114.9	22 16.5	115.9	21 49.5	116.9	21 22.2	117.8	20 54.7	118.8	4 00
3 50	24 52.3	116.1	24 24.8	117.1	23 56.8	118.1	23 28.4	119.0	22 59.7	120.0	3 50
40	27 00.6	117.4	26 31.9	118.4	26 02.6	119.3	25 33.1	120.3	25 03.2	121.3	40
30	29 07.1	118.7	28 37.3	119.7	28 06.9	120.7	27 36.1	121.7	27 04.9	122.6	30
20	31 12.2	120.1	30 41.0	121.1	30 09.4	122.1	29 37.3	123.1	29 04.8	124.0	20
10	33 15.3	121.6	32 43.0	122.6	32 10.0	123.6	31 36.5	124.6	31 02.6	125.5	10
3 00	35 16.5	123.2	34 42.6	124.2	34 08.3	125.2	33 33.4	126.2	32 58.2	127.2	3 00
2 50	37 15.2	124.9	36 40.0	125.9	36 04.2	126.9	35 27.9	127.9	34 51.2	128.9	2 50
40	39 11.6	126.8	38 34.8	127.8	37 57.5	128.8	37 19.7	129.8	36 41.4	130.7	40
30	41 05.0	128.7	40 26.7	129.7	39 47.8	130.7	39 08.3	131.7	38 28.4	132.7	30
20	42 55.3	130.8	42 15.2	131.9	41 34.7	132.8	40 53.7	133.8	40 12.2	134.8	20
10	44 41.9	133.1	44 00.2	134.1	43 18.0	135.1	42 35.2	136.1	41 52.1	137.0	10
2 00	46 24.6	135.5	45 41.1	136.5	44 57.1	137.5	44 12.6	138.5	43 27.8	139.4	2 00
1 50	48 02.6	138.1	47 17.5	139.1	46 41.6	140.1	45 45.4	141.0	44 58.8	141.9	4 50
40	49 35.8	141.0	48 48.7	141.9	48 01.1	142.8	47 13.1	143.7	46 24.7	144.6	40
30	51 03.1	144.0	50 14.2	144.9	49 24.9	145.8	48 35.0	146.6	47 44.8	147.5	30
20	52 24.3	147.2	51 33.4	148.1	50 42.2	148.9	49 50.7	149.7	48 58.9	150.5	20
10	53 37.8	150.7	52 45.8	151.5	51 52.7	152.3	50 59.5	153.0	50 06.1	153.7	10
1 00	54 44.6	154.4	53 50.2	155.1	52 55.6	155.8	52 00.9	156.4	51 05.9	157.1	1 00
0 50	55 42.2	158.3	54 46.4	158.9	53 50.4	159.5	52 54.1	160.1	51 57.6	160.6	0 50
40	56 30.9	162.3	55 33.5	162.8	54 36.1	163.3	53 38.6	163.8	52 41.0	164.3	40
30	57 09.2	166.6	56 11.0	167.0	55 12.2	167.4	54 13.2	167.8	53 15.1	168.1	30
20	57 37.4	171.0	56 38.0	171.2	55 38.7	171.5	54 39.3	171.8	53 40.0	172.0	20
10	57 54.3	175.4	56 54.5	175.6	55 54.7	175.7	54 54.8	175.9	53 55.0	176.0	10
0 00	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 59.4	111.3	0 40.4	112.2	0 21.2	113.2	0 02.2	114.1			5 30
20	3 12.8	112.1	2 52.9	113.0	2 32.8	113.9	2 12.8	114.9	2 57.1	115.8	20
10	5 25.3	112.9	5 04.5	113.8	4 43.5	114.7	4 22.5	115.7	4 01.4	116.6	10
5 00	7 37.1	113.7	7 15.4	114.6	6 53.4	115.6	6 31.4	116.5	6 09.2	117.4	5 00
4 50	9 48.1	114.6	9 25.2	115.5	9 02.2	116.5	8 39.2	117.4	8 16.0	118.3	4 50
40	11 58.0	115.5	11 34.3	116.4	11 10.2	117.4	10 46.1	118.3	10 21.7	119.2	40
30	14 06.9	116.5	13 42.2	117.4	13 17.0	118.4	12 51.7	119.3	12 26.3	120.2	30
20	16 14.8	117.5	15 48.9	118.4	15 22.7	119.4	14 56.3	120.3	14 29.6	121.2	20
10	18 21.4	118.6	17 54.4	119.5	17 27.0	120.5	16 59.4	121.4	16 31.6	122.3	10
4 00	20 26.7	119.7	19 58.6	120.6	19 30.0	121.6	19 01.2	122.5	18 32.1	123.5	4 00
3 50	22 30.6	120.9	22 01.2	121.8	21 31.3	122.8	21 01.3	123.7	20 31.0	124.7	3 50
40	24 32.8	122.2	24 02.2	123.1	23 31.1	124.1	22 59.7	125.0	22 28.1	125.9	40
30	26 33.3	123.6	26 01.4	124.5	25 28.9	125.5	24 56.2	126.4	24 23.2	127.3	30
20	28 31.8	125.0	27 58.6	125.9	27 24.8	126.9	26 50.8	127.8	26 16.3	128.7	20
10	30 28.3	126.5	29 53.7	127.4	29 18.5	128.4	28 42.9	129.3	28 07.1	130.2	10
3 00	32 22.4	128.1	31 46.3	129.1	31 09.7	130.0	30 32.7	130.9	29 55.3	131.8	3 00
2 50	34 13.8	129.8	33 36.2	130.8	32 58.1	131.7	32 19.7	132.6	31 40.8	133.5	2 50
40	36 02.6	131.7	35 23.4	132.6	34 43.8	133.5	34 03.7	134.4	33 23.3	135.3	40
30	37 48.2	133.6	37 07.3	134.5	36 26.1	135.4	35 44.4	136.3	35 02.4	137.2	30
20	39 30.1	135.7	38 47.8	136.6	38 04.9	137.5	37 21.7	138.4	36 38.1	139.3	20
10	41 08.4	137.9	40 24.3	138.8	39 39.8	139.7	38 55.0	140.6	38 09.7	141.4	10
2 00	42 42.4	140.3	41 56.7	141.1	41 10.5	142.0	40 24.0	142.8	39 37.1	143.7	2 00
1 50	44 11.7	142.8	43 24.2	143.6	42 36.4	144.4	41 48.2	145.2	40 59.7	146.1	1 50
40	45 35.9	145.4	44 46.7	146.2	43 57.2	147.0	43 07.4	147.8	42 17.2	148.6	40
30	46 54.4	148.3	46 03.6	149.0	45 12.3	149.8	44 20.9	150.5	43 29.2	151.2	30
20	48 06.7	151.2	47 14.3	151.9	46 21.5	152.7	45 28.5	153.3	44 35.3	154.0	20
10	49 12.2	154.4	48 18.3	155.0	47 24.0	155.7	46 29.6	156.3	45 35.0	156.9	10
1 00	50 10.6	157.7	49 15.2	158.3	48 19.5	158.9	47 23.8	159.4	46 27.8	159.9	1 00
0 50	51 01.1	161.2	50 04.4	161.7	49 07.4	162.2	48 10.5	162.6	47 13.4	163.1	0 50
40	51 43.1	164.7	50 45.3	165.2	49 47.3	165.6	48 49.4	165.9	47 51.2	166.3	40
30	52 16.5	168.4	51 17.8	168.8	50 18.8	169.1	49 20.0	169.4	48 21.0	169.7	30
20	52 40.6	172.3	51 41.1	172.5	50 41.6	172.7	49 42.2	172.9	48 42.6	173.1	20
10	52 55.1	176.1	51 55.3	176.2	50 55.4	176.3	49 55.5	176.4	48 55.6	176.5	10
0 00	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 18. 5	89. 1	0 37. 1	88. 1	0 55. 6	87. 2	1 14. 1	86. 2	6 00
5 50	2 22. 6	90. 8	2 41. 2	89. 8	2 59. 7	88. 9	3 18. 1	87. 9	3 36. 5	87. 0	5 50
40	4 45. 3	91. 6	5 03. 8	90. 6	5 22. 3	89. 6	5 40. 7	88. 7	5 59. 0	87. 7	40
30	7 07. 9	92. 3	7 26. 4	91. 4	7 44. 9	90. 4	8 03. 3	89. 5	8 21. 6	88. 5	30
20	9 30. 4	93. 1	9 49. 0	92. 2	10 07. 6	91. 2	10 26. 0	90. 2	10 44. 2	89. 3	20
10	11 52. 8	93. 9	12 11. 6	92. 9	12 30. 2	92. 0	12 48. 6	91. 0	13 06. 9	90. 0	10
5 00	14 15. 0	94. 7	14 34. 0	93. 7	14 52. 8	92. 8	15 11. 3	91. 8	15 29. 5	90. 8	5 00
4 50	16 37. 1	95. 6	16 56. 3	94. 6	17 15. 4	93. 6	17 33. 8	92. 6	17 52. 1	91. 6	4 50
40	18 59. 0	96. 4	19 18. 3	95. 4	19 37. 5	94. 4	19 56. 3	93. 4	20 14. 8	92. 4	40
30	21 20. 6	97. 3	21 40. 3	96. 3	21 59. 6	95. 2	22 18. 6	94. 2	22 37. 2	93. 2	30
20	23 41. 9	98. 2	24 01. 9	97. 2	24 21. 6	96. 1	24 40. 9	95. 1	24 59. 6	94. 0	20
10	26 03. 0	99. 1	26 23. 3	98. 1	26 43. 2	97. 0	27 02. 8	96. 0	27 21. 8	94. 9	10
4 00	28 23. 6	100. 1	28 44. 4	99. 1	29 04. 8	98. 0	29 24. 6	96. 9	29 43. 8	95. 8	4 00
3 50	30 43. 9	101. 1	31 05. 2	100. 1	31 25. 9	99. 0	31 46. 1	97. 9	32 05. 7	96. 7	3 50
40	33 03. 5	102. 2	33 25. 3	101. 1	33 46. 6	100. 0	34 07. 2	98. 9	34 27. 2	97. 7	40
30	35 22. 6	103. 3	35 45. 1	102. 2	36 06. 8	101. 1	36 27. 9	99. 9	36 48. 4	98. 7	30
20	37 41. 1	104. 5	38 04. 1	103. 4	38 26. 6	102. 2	38 48. 2	101. 0	39 09. 2	99. 8	20
10	39 58. 8	105. 8	40 22. 6	104. 6	40 45. 8	103. 4	41 08. 0	102. 2	41 29. 0	100. 9	10
3 00	42 15. 6	107. 2	42 40. 2	105. 9	43 04. 1	104. 7	43 27. 1	103. 4	43 49. 3	102. 1	3 00
2 50	44 31. 4	108. 6	44 56. 9	107. 4	45 21. 6	106. 1	45 45. 5	104. 8	46 08. 4	103. 4	2 50
40	46 45. 9	110. 2	47 12. 5	108. 9	47 38. 2	107. 6	48 03. 0	106. 2	48 26. 8	104. 8	40
30	48 59. 0	111. 9	49 26. 8	110. 6	49 53. 6	109. 2	50 19. 4	107. 8	50 44. 2	106. 4	30
20	51 10. 5	113. 8	51 39. 5	112. 4	52 07. 5	111. 0	52 34. 5	109. 5	53 00. 5	108. 0	20
10	53 19. 8	115. 9	53 50. 5	114. 5	54 19. 9	112. 9	54 48. 2	111. 4	55 15. 5	109. 9	10
2 00	55 27. 0	118. 2	55 59. 1	116. 7	56 30. 1	115. 1	57 00. 1	113. 5	57 28. 8	111. 9	2 00
1 50	57 31. 2	120. 7	58 05. 2	119. 2	58 38. 0	117. 6	59 09. 6	115. 9	59 40. 0	114. 2	1 50
40	59 32. 2	123. 5	60 08. 2	122. 0	60 43. 0	120. 3	61 16. 4	118. 6	61 48. 8	116. 8	40
30	61 28. 8	126. 7	62 07. 1	125. 1	62 44. 1	123. 4	63 19. 9	121. 6	63 54. 6	119. 8	30
20	63 20. 5	130. 3	64 01. 2	128. 7	64 40. 8	127. 0	65 19. 2	125. 1	65 56. 2	123. 2	20
10	65 05. 8	134. 5	65 49. 4	132. 8	66 31. 8	131. 0	67 12. 9	129. 2	67 52. 8	127. 2	10
1 00	66 43. 8	139. 1	67 30. 1	137. 4	68 15. 5	135. 7	68 59. 8	133. 9	69 42. 8	131. 9	1 00
0 50	68 12. 2	144. 3	69 01. 8	142. 8	69 50. 2	141. 1	70 37. 8	139. 3	71 24. 2	137. 4	0 50
40	69 29. 4	150. 3	70 21. 8	148. 9	71 13. 8	147. 4	72 04. 9	145. 7	72 55. 1	143. 9	40
30	70 32. 9	156. 9	71 28. 2	155. 8	72 23. 5	154. 5	73 17. 8	153. 0	74 11. 5	151. 5	30
20	71 20. 4	164. 2	72 18. 2	163. 3	73 15. 9	162. 4	74 13. 2	161. 3	75 10. 2	160. 1	20
10	71 50. 0	172. 0	72 49. 3	171. 5	73 48. 7	171. 0	74 48. 0	170. 4	75 47. 3	169. 8	10
0 00	72 0. 0	180. 0	73 0. 0	180. 0	74 0. 0	180. 0	75 0. 0	180. 0	76 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 06.5	81.6	0 25.3	80.7	6 10
6 00	1 32.6	85.3	1 51.0	84.3	2 09.5	83.4	2 27.9	82.4	2 46.3	81.4	6 00
5 50	3 54.8	86.0	4 13.1	85.0	4 31.2	84.1	4 49.4	83.1	5 07.4	82.2	5 50
40	6 17.2	86.8	6 35.2	85.8	6 53.2	84.8	7 11.2	83.9	7 28.9	82.9	40
30	8 39.6	87.6	8 57.6	86.6	9 15.4	85.6	9 33.1	84.6	9 50.5	83.6	30
20	11 02.3	88.3	11 20.1	87.3	11 37.7	86.3	11 55.3	85.4	12 12.5	84.4	20
10	13 24.8	89.0	13 42.7	88.0	14 00.2	87.1	14 17.4	86.1	14 34.5	85.1	10
5 00	15 47.5	89.8	16 05.2	88.8	16 22.7	87.8	16 39.9	86.8	16 56.8	85.8	5 00
4 50	18 10.1	90.6	18 27.9	89.6	18 45.2	88.6	19 02.3	87.5	19 19.1	86.5	4 50
40	20 32.8	91.4	20 50.5	90.4	21 07.9	89.3	21 24.9	88.3	21 41.5	87.3	40
30	22 55.4	92.2	23 13.1	91.1	23 30.6	90.1	23 47.5	89.0	24 04.0	88.0	30
20	25 17.9	93.0	25 35.7	91.9	25 53.2	90.9	26 10.2	89.8	26 26.7	88.7	20
10	27 40.2	93.8	27 58.2	92.7	28 15.8	91.7	28 32.8	90.6	28 49.2	89.5	10
4 00	30 02.6	94.7	30 20.7	93.6	30 38.3	92.5	30 55.5	91.4	31 12.0	90.3	4 00
3 50	32 24.6	95.7	32 43.1	94.5	33 00.8	93.3	33 18.0	92.2	33 34.6	91.1	3 50
40	34 46.5	96.5	35 05.2	95.4	35 23.2	94.2	35 40.6	93.0	35 57.2	91.9	40
30	37 08.0	97.5	37 27.1	96.3	37 45.4	95.1	38 02.9	93.9	38 19.7	92.7	30
20	39 29.3	98.6	39 48.7	97.3	40 07.3	96.1	40 25.2	94.9	40 42.3	93.6	20
10	41 50.2	99.7	42 10.1	98.4	42 29.0	97.1	42 47.2	95.9	43 04.5	94.5	10
3 00	44 10.6	100.8	44 31.0	99.5	44 50.4	98.2	45 09.0	96.9	45 26.6	95.5	3 00
2 50	46 30.3	102.1	46 51.5	100.7	47 11.4	99.3	47 30.4	97.9	47 48.4	96.5	2 50
40	48 49.5	103.4	49 11.2	102.0	49 31.9	100.6	49 51.5	99.1	50 10.0	97.6	40
30	51 07.9	104.9	51 30.4	103.4	51 51.9	101.9	52 12.1	100.4	52 31.2	98.8	30
20	53 25.3	106.5	53 48.7	105.0	54 11.0	103.4	54 32.2	101.8	54 52.1	100.1	20
10	55 41.4	108.3	56 06.0	106.6	56 29.4	105.0	56 51.4	103.3	57 12.0	101.5	10
2 00	57 56.1	110.2	58 22.0	108.5	58 46.6	106.8	59 09.8	105.0	59 31.6	103.2	2 00
1 50	60 08.8	112.4	60 36.2	110.7	61 02.4	108.8	61 26.9	106.9	61 49.7	105.0	1 50
40	62 19.6	115.0	62 48.7	113.1	63 16.5	111.1	63 42.6	109.1	64 07.1	107.0	40
30	64 27.2	117.9	64 58.6	115.9	65 28.4	113.8	65 56.4	111.7	66 22.5	109.4	30
20	66 31.5	121.2	67 05.3	119.1	67 37.3	116.9	68 07.6	114.6	68 35.9	112.2	20
10	68 31.0	125.1	69 07.5	122.9	69 42.4	120.6	70 15.4	118.2	70 46.2	115.6	10
1 00	70 24.3	129.7	71 04.1	127.5	71 42.3	125.1	72 18.8	122.5	72 52.9	119.7	1 00
0 50	72 09.5	135.3	72 53.2	133.0	73 35.3	130.5	74 15.2	127.8	74 53.2	124.8	0 50
40	73 44.1	141.9	74 31.8	139.7	75 18.2	137.2	76 03.1	134.5	76 45.8	131.5	40
30	75 04.5	149.7	75 56.8	147.7	76 47.4	145.5	77 37.0	142.9	78 25.0	140.0	30
20	76 06.6	158.8	77 02.6	157.3	77 58.0	155.4	78 52.9	153.4	79 46.5	151.0	20
10	76 46.4	169.0	77 45.3	168.2	78 44.0	167.2	79 42.5	166.0	80 40.8	164.6	10
0 00	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 44.0	79.7	1 02.6	78.8	1 21.4	77.8	1 40.1	76.9	1 58.7	75.9	6 10
6 00	3 04.5	80.5	3 22.8	79.5	3 41.0	78.6	3 59.1	77.6	4 17.2	76.7	6 00
5 50	5 25.4	81.2	5 43.0	80.3	6 01.1	79.3	6 18.7	78.3	6 36.2	77.4	5 50
40	7 46.5	82.0	8 04.1	81.0	8 21.3	80.0	8 38.6	79.1	8 55.6	78.1	40
30	10 07.9	82.7	10 25.0	81.7	10 42.0	80.7	10 58.8	79.8	11 15.4	78.8	30
20	12 29.5	83.4	12 46.4	82.4	13 02.9	81.4	13 19.3	80.5	13 35.5	79.5	20
10	14 51.3	84.1	15 07.8	83.1	15 24.2	82.1	15 40.1	81.1	15 55.9	80.1	10
5 00	17 13.2	84.8	17 29.6	83.8	17 45.6	82.8	18 01.2	81.8	18 16.6	80.8	5 00
4 50	19 35.4	85.5	19 51.4	84.5	20 07.2	83.5	20 22.6	82.4	20 37.5	81.4	4 50
40	21 57.7	86.2	22 13.6	85.2	22 29.0	84.1	22 44.0	83.1	22 58.6	82.0	40
30	24 20.2	86.9	24 35.8	85.9	24 51.1	84.8	25 05.7	83.7	25 20.1	82.6	30
20	26 42.6	87.7	26 58.1	86.6	27 13.1	85.5	27 27.7	84.4	27 41.6	83.3	20
10	29 04.2	88.4	29 20.5	87.3	29 35.4	86.2	29 49.8	85.1	30 03.4	83.9	10
4 00	31 27.8	89.1	31 43.1	88.0	31 57.8	86.9	32 11.9	85.7	32 25.4	84.6	4 00
3 50	33 50.4	89.9	34 05.7	88.7	34 20.4	87.6	34 34.2	86.4	34 47.4	85.2	3 50
40	36 13.1	90.7	36 28.4	89.5	36 42.8	88.3	36 56.7	87.0	37 09.7	85.8	40
30	38 35.7	91.5	38 51.0	90.2	39 05.5	89.0	39 19.1	87.7	39 32.0	86.5	30
20	40 58.4	92.3	41 13.8	91.0	41 28.1	89.7	41 41.7	88.4	41 54.4	87.1	20
10	43 20.8	93.2	43 36.3	91.9	43 50.7	90.5	44 04.4	89.1	44 16.9	87.8	10
3 00	45 43.2	94.1	45 58.9	92.7	46 13.4	91.3	46 27.0	89.9	46 39.5	88.5	3 00
2 50	48 05.3	95.1	48 21.2	93.6	48 36.0	92.2	48 49.8	90.7	49 02.1	89.2	2 50
40	50 27.4	96.1	50 43.6	94.6	50 58.5	93.1	51 12.3	91.5	51 24.8	90.0	40
30	52 49.0	97.3	53 05.5	95.7	53 21.0	94.1	53 34.9	92.4	53 47.4	90.8	30
20	55 10.4	98.5	55 27.6	96.8	55 43.0	95.1	55 57.3	93.3	56 10.1	91.6	20
10	57 31.3	99.8	57 49.0	98.0	58 05.0	96.2	58 19.8	94.4	58 32.6	92.5	10
2 00	59 51.5	101.3	60 10.0	99.4	60 26.7	97.5	60 41.8	95.5	60 55.2	93.5	2 00
1 50	62 11.0	103.0	62 30.4	100.9	62 47.9	98.9	63 03.8	96.7	63 17.5	94.6	1 50
40	64 29.4	104.9	64 50.1	102.7	65 08.5	100.5	65 25.1	98.1	65 39.5	95.8	40
30	66 46.5	107.1	67 08.6	104.7	67 28.4	102.3	67 46.0	99.8	68 01.0	97.2	30
20	69 01.9	109.7	69 25.8	107.1	69 47.2	104.5	70 06.2	101.7	70 22.7	98.8	20
10	71 14.6	112.9	71 41.0	110.0	72 04.5	107.1	72 25.2	104.0	72 43.2	100.8	10
1 00	73 24.3	116.8	73 56.3	113.6	74 19.6	110.4	74 42.7	106.9	75 02.7	103.3	1 00
0 50	75 29.4	121.8	76 01.7	118.3	76 31.4	114.7	76 58.0	110.8	77 20.3	106.6	0 50
40	77 25.8	128.2	78 03.6	124.5	78 37.9	120.5	79 09.0	116.0	79 35.6	111.1	40
30	79 11.0	136.8	79 54.4	132.9	80 35.7	128.6	81 12.7	123.6	81 45.0	118.0	30
20	80 38.6	148.1	81 29.3	144.7	82 17.8	140.5	83 03.4	135.4	83 44.8	129.0	20
10	81 38.4	162.8	82 35.6	160.6	83 32.0	157.7	84 27.0	153.9	85 20.0	148.7	10
0 00	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20			0 18.9	73.3	0 38.1	72.3	0 57.2	71.4	1 16.4	70.4	6 20
6 10	2 17.2	75.0	2 35.8	74.0	2 54.2	73.1	3 12.7	72.1	3 31.1	71.2	6 10
6 00	4 35.2	75.7	4 53.1	74.8	5 11.0	73.8	5 28.8	72.8	5 46.5	71.9	6 00
5 50	6 53.7	76.4	7 11.1	75.5	7 28.1	74.5	7 45.2	73.5	8 02.2	72.6	5 50
40	9 12.5	77.1	9 29.3	76.2	9 45.9	75.2	10 02.4	74.2	10 18.6	73.2	40
30	11 31.8	77.8	11 48.0	76.8	12 04.0	75.8	12 19.8	74.8	12 35.3	73.8	30
20	13 51.4	78.5	14 07.1	77.5	14 22.6	76.5	14 37.8	75.5	14 52.7	74.5	20
10	16 11.4	79.1	16 27.0	78.1	16 41.4	77.1	16 56.0	76.1	17 10.3	75.1	10
5 00	18 31.6	79.8	18 46.3	78.7	19 00.6	77.7	19 14.7	76.7	19 28.3	75.6	5 00
4 50	20 52.1	80.4	21 06.4	79.3	21 20.1	78.3	21 33.6	77.3	21 46.6	76.2	4 50
40	23 12.8	81.0	23 26.6	79.9	23 40.0	78.9	23 53.0	77.8	24 05.4	76.7	40
30	25 33.8	81.6	25 47.2	80.5	26 00.0	79.4	26 12.4	78.3	26 24.3	77.2	30
20	27 55.1	82.2	28 08.0	81.1	28 20.5	80.0	28 32.3	78.9	28 43.6	77.7	20
10	30 16.5	82.8	30 29.1	81.6	30 40.9	80.5	30 52.3	79.4	31 03.2	78.2	10
4 00	32 38.2	83.4	32 50.3	82.2	33 01.9	81.1	33 12.8	79.9	33 23.0	78.7	4 00
3 50	34 59.9	84.0	35 11.8	82.8	35 22.8	81.6	35 33.2	80.4	35 42.9	79.2	3 50
40	37 21.9	84.6	37 33.4	83.4	37 44.1	82.1	37 54.1	80.9	38 03.2	79.6	40
30	39 44.0	85.2	39 55.2	83.9	40 05.4	82.6	40 15.0	81.3	40 23.6	80.0	30
20	42 06.2	85.8	42 17.1	84.5	42 27.1	83.1	42 36.2	81.8	42 44.2	80.4	20
10	44 28.5	86.4	44 39.2	85.1	44 48.7	83.7	44 57.3	82.3	45 04.9	80.9	10
3 00	46 51.0	87.0	47 01.3	85.6	47 10.6	84.2	47 18.9	82.7	47 25.9	81.3	3 00
2 50	49 13.5	87.7	49 23.2	86.2	49 32.5	84.7	49 40.4	83.1	49 46.8	81.6	2 50
40	51 36.0	88.4	51 46.0	86.8	51 54.8	85.2	52 02.1	83.6	52 08.2	82.0	40
30	53 58.6	89.1	54 08.6	87.4	54 16.8	85.7	54 23.9	84.0	54 29.4	82.3	30
20	56 21.3	89.8	56 31.0	88.0	56 39.3	86.2	56 45.9	84.4	56 50.9	82.6	20
10	58 43.9	90.6	58 53.9	88.7	59 01.5	86.8	59 07.9	84.9	59 12.2	82.9	10
2 00	61 06.6	91.5	61 16.2	89.4	61 24.1	87.4	61 30.1	85.3	61 34.0	83.2	2 00
1 50	63 29.1	92.4	63 39.0	90.2	63 46.5	87.9	63 52.2	85.7	63 55.6	83.4	1 50
40	65 51.7	93.4	66 01.6	91.0	66 09.3	88.5	66 14.7	86.1	66 17.5	83.6	40
30	68 14.0	94.6	68 24.5	91.9	68 31.8	89.2	68 37.0	86.5	68 39.2	83.7	30
20	70 36.0	95.9	70 46.7	92.9	70 54.5	89.9	70 59.4	86.9	71 01.2	83.8	20
10	72 57.5	97.6	73 09.2	94.1	73 17.0	90.8	73 21.8	87.3	73 22.7	83.8	10
1 00	75 18.6	99.6	75 31.1	95.7	75 39.8	91.7	75 44.4	87.7	75 44.9	83.6	1 00
0 50	77 38.8	102.2	77 53.0	97.6	78 02.3	92.9	78 07.0	88.1	78 06.2	83.2	0 50
40	79 57.3	105.9	80 13.7	100.3	80 24.7	94.5	80 29.3	88.5	80 27.8	82.4	40
30	82 12.5	111.6	82 33.5	104.5	82 46.5	96.8	82 52.0	88.8	82 48.3	80.8	30
20	84 20.7	121.3	84 49.0	112.0	85 07.6	101.1	85 14.6	89.2	85 09.2	77.3	20
10	86 09.5	141.0	86 53.0	129.6	87 24.9	112.4	87 37.2	89.6	87 25.6	66.7	10
0 00	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30					0 02. 2	66. 8	0 22. 2	65. 9	0 42. 2	64. 9	6 30
20	1 35. 6	69. 5	1 54. 8	68. 5	2 13. 8	67. 6	2 32. 9	66. 6	2 51. 9	65. 7	20
10	3 49. 5	70. 2	4 07. 7	69. 2	4 26. 0	68. 3	4 44. 1	67. 3	5 02. 2	66. 4	10
6 00	6 04. 0	70. 9	6 21. 5	69. 9	6 38. 9	69. 0	6 56. 1	68. 0	7 13. 2	67. 1	6 00
5 50	8 19. 2	71. 6	8 35. 7	70. 6	8 52. 2	69. 6	9 08. 7	68. 7	9 24. 8	67. 7	5 50
40	10 34. 7	72. 2	10 50. 5	71. 3	11 06. 3	70. 3	11 21. 8	69. 3	11 37. 2	68. 3	40
30	12 50. 7	72. 8	13 05. 8	71. 9	13 20. 7	70. 9	13 35. 5	69. 9	13 49. 9	68. 9	30
20	15 07. 3	73. 5	15 21. 7	72. 5	15 35. 9	71. 5	15 49. 7	70. 4	16 03. 3	69. 4	20
10	17 24. 2	74. 0	17 38. 0	73. 0	17 51. 2	72. 0	18 04. 3	71. 0	18 17. 1	69. 9	10
5 00	19 41. 7	74. 6	19 54. 6	73. 6	20 07. 2	72. 5	20 19. 4	71. 5	20 31. 3	70. 4	5 00
4 50	21 59. 3	75. 1	22 11. 6	74. 1	22 23. 4	73. 0	22 34. 8	72. 0	22 45. 8	70. 9	4 50
40	24 17. 4	75. 6	24 28. 9	74. 6	24 40. 0	73. 5	24 50. 6	72. 4	25 00. 8	71. 3	40
30	26 35. 7	76. 1	26 46. 6	75. 1	26 56. 9	73. 9	27 06. 8	72. 8	27 16. 1	71. 7	30
20	28 54. 4	76. 6	29 04. 6	75. 5	29 14. 2	74. 4	29 23. 3	73. 2	29 31. 8	72. 1	20
10	31 13. 3	77. 1	31 22. 7	75. 9	31 31. 7	74. 8	31 39. 9	73. 6	31 47. 6	72. 5	10
4 00	33 32. 5	77. 5	33 41. 3	76. 3	33 49. 5	75. 2	33 56. 9	74. 0	34 03. 7	72. 8	4 00
3 50	35 52. 0	77. 9	36 00. 1	76. 7	36 07. 5	75. 5	36 14. 5	74. 3	36 20. 2	73. 1	3 50
40	38 11. 5	78. 4	38 19. 0	77. 1	38 25. 7	75. 8	38 31. 6	74. 6	38 36. 6	73. 3	40
30	40 31. 4	78. 7	40 38. 1	77. 4	40 44. 1	76. 1	40 49. 2	74. 8	40 53. 3	73. 5	30
20	42 51. 3	79. 1	42 57. 4	77. 7	43 02. 7	76. 4	43 06. 9	75. 0	43 10. 2	73. 7	20
10	45 11. 6	79. 5	45 16. 9	78. 0	45 21. 4	76. 6	45 24. 8	75. 2	45 27. 1	73. 8	10
3 00	47 31. 8	79. 8	47 36. 6	78. 3	47 40. 3	76. 8	47 42. 7	75. 3	47 44. 1	73. 9	3 00
2 50	49 52. 2	80. 1	49 56. 2	78. 5	49 59. 1	77. 0	50 00. 8	75. 4	50 01. 1	73. 9	2 50
40	52 12. 9	80. 3	52 16. 1	78. 7	52 18. 2	77. 1	52 18. 8	75. 4	52 18. 1	73. 8	40
30	54 33. 6	80. 6	54 36. 1	78. 9	54 37. 2	77. 1	54 36. 9	75. 4	54 35. 1	73. 7	30
20	56 54. 4	80. 8	56 56. 0	79. 0	56 56. 3	77. 1	56 54. 9	75. 3	56 51. 9	73. 4	20
10	59 15. 2	81. 0	59 16. 0	79. 0	59 15. 2	77. 0	59 12. 7	75. 1	59 08. 5	73. 1	10
2 00	61 36. 1	81. 1	61 36. 1	79. 0	61 34. 3	76. 9	61 30. 6	74. 8	61 24. 9	72. 7	2 00
1 50	63 57. 0	81. 1	63 56. 1	78. 9	63 53. 2	76. 6	63 48. 1	74. 3	63 41. 0	72. 1	1 50
40	66 18. 0	81. 1	66 16. 0	78. 6	66 11. 8	76. 2	66 05. 2	73. 7	65 56. 3	71. 3	40
30	68 39. 0	81. 0	68 35. 7	78. 2	68 30. 2	75. 5	68 22. 0	72. 8	68 11. 0	70. 2	30
20	70 59. 7	80. 7	70 55. 4	77. 7	70 48. 1	74. 7	70 37. 7	71. 7	70 24. 6	68. 8	20
10	73 20. 5	80. 3	73 14. 5	76. 8	73 05. 2	73. 5	72 52. 7	70. 1	72 36. 7	66. 9	10
1 00	75 40. 9	79. 6	75 33. 1	75. 6	75 21. 4	71. 8	75 05. 6	67. 9	74 46. 6	64. 3	1 00
0 50	78 01. 2	78. 5	77 50. 7	73. 7	77 35. 7	69. 2	77 16. 7	64. 8	76 53. 2	60. 7	0 50
40	80 20. 4	76. 5	80 06. 6	70. 7	79 47. 5	65. 4	79 22. 8	60. 2	78 54. 5	55. 6	40
30	82 38. 0	73. 0	82 19. 0	65. 8	81 54. 0	59. 2	81 23. 0	53. 3	80 47. 0	48. 1	30
20	84 52. 0	66. 3	84 24. 8	56. 7	83 49. 7	48. 8	83 08. 9	42. 3	82 24. 0	37. 0	20
10	86 54. 3	49. 4	86 11. 1	37. 7	85 21. 7	30. 0	84 28. 7	24. 7	83 33. 8	20. 8	10
0 00	88 0. 0	0. 0	87 0. 0	0. 0	86 0. 0	0. 0	85 0. 0	0. 0	84 0. 0	0. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 22.6	90.8	2 04.1	91.8	1 45.5	92.7	1 26.8	93.6	1 08.1	94.6	5 50
40	4 45.3	91.6	4 26.6	92.5	4 07.9	93.5	3 49.1	94.4	3 30.3	95.4	40
30	7 07.9	92.3	6 49.1	93.2	6 30.2	94.2	6 11.2	95.2	5 52.2	96.2	30
20	9 30.4	93.1	9 11.4	94.1	8 52.4	95.0	8 33.2	96.0	8 13.9	97.0	20
10	11 52.8	93.9	11 33.7	94.9	11 14.5	95.8	10 55.1	96.8	10 35.4	97.8	10
5 00	14 15.0	94.7	13 55.8	95.7	13 36.2	96.7	13 16.5	97.7	12 56.6	98.6	5 00
4 50	16 37.1	95.6	16 17.6	96.5	15 57.9	97.5	15 37.8	98.5	15 17.4	99.5	4 50
40	18 59.0	96.4	18 39.1	97.4	18 19.1	98.4	17 58.7	99.4	17 38.0	100.4	40
30	21 20.6	97.3	21 00.6	98.3	20 40.0	99.3	20 19.2	100.3	19 58.1	101.3	30
20	23 41.9	98.2	23 21.4	99.2	23 00.6	100.3	22 39.4	101.3	22 17.7	102.3	20
10	26 03.0	99.1	25 42.1	100.2	25 20.8	101.2	24 59.1	102.3	24 36.8	103.3	10
4 00	28 23.6	100.1	28 02.3	101.2	27 40.5	102.2	27 18.2	103.3	26 55.4	104.3	4 00
3 50	30 43.9	101.1	30 22.0	102.2	29 59.6	103.3	29 36.8	104.4	29 13.3	105.4	3 50
40	33 03.5	102.2	32 41.1	103.3	32 18.1	104.4	31 54.6	105.5	31 30.5	106.6	40
30	35 22.6	103.3	34 59.6	104.4	34 36.0	105.6	34 11.7	106.7	33 46.8	107.8	30
20	37 41.1	104.5	37 17.3	105.7	36 52.9	106.8	36 27.8	108.0	36 02.1	109.1	20
10	39 58.8	105.8	39 34.2	107.0	39 09.0	108.2	38 43.1	109.4	38 16.3	110.5	10
3 00	42 15.6	107.2	41 50.2	108.4	41 23.9	109.6	40 57.0	110.8	40 29.3	112.0	3 00
2 50	44 31.4	108.6	44 04.9	109.9	43 37.8	111.1	43 09.7	112.3	42 40.9	113.5	2 50
40	46 45.9	110.2	46 18.4	111.5	45 50.0	112.8	45 20.8	114.0	44 50.8	115.3	40
30	48 59.0	111.9	48 30.3	113.3	48 00.8	114.6	47 30.2	115.8	46 58.8	117.1	30
20	51 10.5	113.8	50 40.5	115.2	50 09.3	116.5	49 37.4	117.8	49 04.7	119.1	20
10	53 19.8	115.9	52 48.4	117.3	52 15.9	118.7	51 42.4	120.0	51 08.0	121.3	10
2 00	55 27.0	118.2	54 53.8	119.6	54 19.5	121.0	53 44.3	122.4	53 08.3	123.8	2 00
1 50	57 31.2	120.7	56 56.2	122.2	56 20.1	123.7	55 43.0	125.1	55 05.0	126.5	1 50
40	59 32.2	123.5	58 55.1	125.1	58 16.9	126.6	57 37.6	128.0	56 57.7	129.4	40
30	61 28.8	126.7	60 49.5	128.3	60 09.0	129.8	59 27.6	131.2	58 45.4	132.6	30
20	63 20.5	130.3	62 38.7	131.9	61 55.7	133.4	61 12.0	134.8	60 27.3	136.2	20
10	65 05.8	134.5	64 21.4	136.0	63 35.9	137.5	62 49.5	138.9	62 02.5	140.2	10
1 00	66 43.8	139.1	65 56.3	140.6	65 08.1	142.1	64 19.1	143.4	63 29.4	144.7	1 00
0 50	68 12.2	144.3	67 22.0	145.8	66 30.9	147.1	65 39.1	148.4	64 46.8	149.6	0 50
40	69 29.4	150.3	68 36.0	151.6	67 42.3	152.8	66 48.1	153.9	65 53.4	154.9	40
30	70 32.9	156.9	69 37.0	158.0	68 41.0	159.0	67 44.2	159.9	66 47.4	160.7	30
20	71 20.4	164.2	70 22.4	164.9	69 24.2	165.6	68 25.7	166.3	67 27.2	166.9	20
10	71 50.0	172.0	70 50.5	172.4	69 51.0	172.7	68 51.4	173.1	67 51.8	173.4	10
0 00	72 0.0	180.0	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 49.5	95.5	0 30.8	96.5	0 12.0	97.4					5 50
40	3 11.4	96.3	2 52.4	97.3	2 33.4	98.2	2 14.3	99.2	1 55.3	100.1	40
30	5 33.0	97.1	5 13.8	98.1	4 54.4	99.0	4 35.1	100.0	4 15.4	100.9	30
20	7 54.5	97.9	7 34.9	98.9	7 15.2	99.8	6 55.4	100.8	6 35.5	101.7	20
10	10 15.6	98.8	9 55.7	99.8	9 35.6	100.6	9 15.4	101.6	8 54.9	102.5	10
5 00	12 36.5	99.6	12 16.1	100.6	11 55.6	101.5	11 34.8	102.5	11 13.9	103.4	5 00
4 50	14 56.9	100.5	14 36.2	101.4	14 15.1	102.4	13 53.9	103.4	13 32.4	104.3	4 50
40	17 17.0	101.4	16 55.7	102.4	16 34.2	103.3	16 12.4	104.3	15 50.4	105.2	40
30	19 36.7	102.3	19 14.8	103.3	18 52.8	104.3	18 30.4	105.3	18 07.6	106.2	30
20	21 55.8	103.3	21 33.4	104.3	21 10.7	105.3	20 47.7	106.3	20 24.3	107.2	20
10	24 14.3	104.3	23 51.2	105.3	23 27.9	106.3	23 04.2	107.3	22 40.1	108.3	10
4 00	26 32.2	105.4	26 08.5	106.4	25 44.5	107.4	25 20.1	108.4	24 55.2	109.4	4 00
3 50	28 49.4	106.5	28 25.1	107.5	28 00.2	108.5	27 34.9	109.6	27 09.2	110.6	3 50
40	31 05.8	107.7	30 40.6	108.7	30 15.0	109.7	29 48.8	110.8	29 22.2	111.8	40
30	33 21.2	108.9	32 55.2	110.0	32 28.7	111.0	32 01.6	112.1	31 33.9	113.1	30
20	35 35.7	110.2	35 08.8	111.3	34 41.3	112.4	34 13.2	113.5	33 44.6	114.5	20
10	37 49.0	111.6	37 21.1	112.8	36 52.5	113.9	36 23.4	115.0	35 53.6	116.0	10
3 00	40 00.9	113.1	39 31.9	114.3	39 02.2	115.4	38 31.9	116.5	38 00.9	117.6	3 00
2 50	42 11.3	114.7	41 41.1	115.9	41 10.2	117.0	40 38.6	118.1	40 06.4	119.3	2 50
40	44 20.1	116.5	43 48.5	117.7	43 16.2	118.8	42 43.4	120.0	42 09.8	121.1	40
30	46 26.8	118.4	45 53.8	119.6	45 20.2	120.7	44 45.8	121.9	44 10.6	123.1	30
20	48 31.1	120.4	47 56.6	121.6	47 21.4	122.8	46 45.5	124.0	46 09.0	125.2	20
10	50 32.8	122.6	49 56.6	123.9	49 19.7	125.1	48 42.2	126.3	48 03.8	127.5	10
2 00	52 31.2	125.1	51 53.4	126.3	51 14.7	127.6	50 35.4	128.8	49 55.4	129.9	2 00
1 50	54 26.0	127.7	53 46.4	129.0	53 05.8	130.3	52 24.6	131.5	51 42.4	132.6	1 50
40	56 16.6	130.7	55 34.8	132.0	54 52.2	133.2	54 09.0	134.4	53 25.2	135.6	40
30	58 02.1	133.9	57 18.2	135.2	56 33.5	136.4	55 48.3	137.6	55 02.1	138.7	30
20	59 41.8	137.5	58 55.6	138.8	58 08.6	140.0	57 21.0	141.1	56 33.0	142.2	20
10	61 14.5	141.5	60 25.9	142.7	59 36.6	143.9	58 47.0	145.0	57 56.6	146.0	10
1 00	62 39.0	145.9	61 48.1	147.0	60 56.5	148.1	60 04.7	149.1	59 12.4	150.0	1 00
0 50	63 54.1	150.7	63 00.9	151.7	62 07.3	152.7	61 13.3	153.6	60 18.7	154.4	0 50
40	64 58.4	155.9	64 13.0	156.8	63 07.2	157.6	62 11.3	158.4	61 15.2	159.1	40
30	65 50.4	161.5	64 53.1	162.2	63 56.3	162.9	62 58.0	163.5	62 00.2	164.1	30
20	66 28.5	167.4	65 29.8	167.9	64 31.0	168.4	63 32.0	168.8	62 33.2	169.2	20
10	66 52.1	173.7	65 52.5	173.9	64 52.8	174.2	63 53.0	174.4	62 53.3	174.6	10
0 00	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 36.1	101.1	1 17.1	102.0	0 57.9	103.0	0 38.7	103.9	0 19.5	104.8	5 40
30	3 55.9	101.9	3 36.3	102.8	3 16.6	103.8	2 56.8	104.7	2 37.1	105.7	30
20	6 15.3	102.7	5 55.2	103.6	5 35.0	104.6	5 14.7	105.5	4 54.2	106.5	20
10	8 34.4	103.5	8 13.6	104.4	7 52.9	105.4	7 31.8	106.3	7 10.7	107.3	10
5 00	10 52.8	104.4	10 31.5	105.3	10 10.1	106.3	9 48.5	107.2	9 26.7	108.2	5 00
4 50	13 10.6	105.3	12 48.7	106.2	12 26.6	107.2	12 04.3	108.1	11 41.8	109.1	4 50
40	15 28.0	106.2	15 05.5	107.2	14 42.6	108.1	14 19.5	109.1	13 56.2	110.1	40
30	17 44.6	107.2	17 21.4	108.2	16 57.8	109.1	16 33.8	110.1	16 09.8	111.1	30
20	20 00.5	108.2	19 36.5	109.2	19 12.1	110.2	18 47.5	111.1	18 22.5	112.1	20
10	22 15.6	109.3	21 50.7	110.3	21 25.5	111.3	21 00.1	112.2	20 34.1	113.2	10
4 00	24 29.8	110.4	24 04.1	111.4	23 38.0	112.4	23 11.6	113.4	22 44.8	114.3	4 00
3 50	26 42.9	111.6	26 16.4	112.6	25 49.3	113.6	25 21.9	114.6	24 54.1	115.5	3 50
40	28 55.0	112.9	28 27.5	113.9	27 59.5	114.9	27 31.0	115.9	27 02.2	116.8	40
30	31 05.8	114.2	30 37.3	115.2	30 08.2	116.2	29 38.6	117.2	29 08.6	118.2	30
20	33 15.4	115.6	32 45.7	116.6	32 15.4	117.6	31 44.8	118.6	31 13.5	119.6	20
10	35 23.3	117.1	34 52.4	118.1	34 20.9	119.2	33 49.0	120.2	33 16.5	121.2	10
3 00	37 29.4	118.7	36 57.3	119.7	36 24.6	120.8	35 51.4	121.8	35 17.6	122.8	3 00
2 50	39 33.5	120.4	39 00.1	121.4	38 26.1	122.5	37 51.4	123.5	37 16.3	124.5	2 50
40	41 35.5	122.2	41 00.7	123.2	40 25.2	124.3	39 49.2	125.4	39 12.6	126.4	40
30	43 34.9	124.2	42 58.5	125.2	42 21.6	126.3	41 44.0	127.4	41 05.8	128.4	30
20	45 31.5	126.3	44 53.6	127.3	44 14.9	128.4	43 35.8	129.5	42 56.1	130.5	20
10	47 24.8	128.6	46 45.2	129.6	46 04.9	130.7	45 24.1	131.8	44 42.6	132.8	10
2 00	49 14.4	131.1	48 33.1	132.1	47 51.0	133.2	47 08.4	134.3	46 25.3	135.3	2 00
1 50	50 59.9	133.7	50 16.6	134.8	49 32.6	135.9	48 48.2	136.9	48 03.2	137.9	1 50
40	52 40.4	136.7	51 55.2	137.7	51 09.4	138.8	50 23.1	139.8	49 36.3	140.7	40
30	54 15.4	139.8	53 28.3	140.8	52 40.5	141.9	51 52.2	142.9	51 03.5	143.8	30
20	55 44.2	143.3	54 55.0	144.2	54 05.3	145.2	53 15.2	146.2	52 24.7	147.1	20
10	57 05.8	147.0	56 14.8	147.9	55 22.9	148.8	54 30.9	149.7	53 38.6	150.5	10
1 00	58 19.4	151.0	57 26.3	151.8	56 32.8	152.7	55 38.9	153.5	54 44.9	154.2	1 00
0 50	59 24.0	155.3	58 29.1	156.0	57 33.6	156.8	56 38.2	157.5	55 42.4	158.1	0 50
40	60 18.5	159.8	59 22.0	160.5	58 25.1	161.1	57 28.1	161.7	56 31.0	162.2	40
30	61 02.1	164.6	60 04.2	165.1	59 06.0	165.7	58 07.6	166.1	57 09.2	166.5	30
20	61 34.1	169.6	60 35.1	170.0	59 35.9	170.3	58 36.6	170.6	57 37.4	170.9	20
10	61 53.5	174.8	60 53.7	175.0	59 53.9	175.1	58 54.1	175.3	57 54.3	175.4	10
0 00	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 00. 2	105. 8									5 40
30	2 17. 3	106. 6	1 57. 4	107. 5	1 37. 5	108. 5	1 17. 5	109. 4	0 57. 6	110. 4	30
20	4 33. 7	107. 4	4 13. 1	108. 3	3 52. 5	109. 3	3 31. 9	110. 2	3 11. 1	111. 2	20
10	6 49. 7	108. 2	6 28. 2	109. 2	6 06. 8	110. 2	5 45. 4	111. 1	5 23. 7	112. 0	10
5 00	9 04. 7	109. 1	8 42. 6	110. 1	8 20. 4	111. 0	7 58. 1	111. 9	7 35. 6	112. 9	5 00
4 50	11 19. 1	110. 0	10 56. 2	111. 0	10 33. 1	111. 9	10 09. 9	112. 8	9 46. 6	113. 8	4 50
40	13 32. 7	111. 0	13 09. 0	111. 9	12 45. 1	112. 9	12 21. 0	113. 8	11 56. 7	114. 8	40
30	15 45. 5	112. 0	15 20. 9	112. 9	14 56. 0	113. 9	14 30. 9	114. 8	14 05. 7	115. 8	30
20	17 57. 2	113. 1	17 31. 7	114. 0	17 05. 9	115. 0	16 39. 9	115. 9	16 13. 6	116. 8	20
10	20 08. 1	114. 2	19 41. 5	115. 1	19 14. 7	116. 1	18 47. 6	117. 0	18 20. 2	117. 9	10
4 00	22 17. 6	115. 3	21 50. 1	116. 3	21 22. 2	117. 2	20 54. 2	118. 2	20 25. 6	119. 1	4 00
3 50	24 25. 9	116. 5	23 57. 3	117. 5	23 28. 4	118. 4	22 59. 1	119. 4	22 29. 6	120. 3	3 50
40	26 32. 8	117. 8	26 03. 1	118. 8	25 33. 1	119. 7	25 02. 7	120. 7	24 31. 9	121. 6	40
30	28 38. 3	119. 2	28 07. 3	120. 2	27 36. 1	121. 1	27 04. 6	122. 1	26 32. 4	123. 0	30
20	30 41. 9	120. 6	30 09. 8	121. 6	29 37. 3	122. 6	29 04. 4	123. 5	28 31. 0	124. 5	20
10	32 43. 8	122. 2	32 10. 3	123. 2	31 36. 5	124. 2	31 02. 1	125. 1	30 27. 5	126. 1	10
3 00	34 43. 3	123. 8	34 08. 6	124. 8	33 33. 4	125. 8	32 57. 8	126. 7	32 21. 7	127. 7	3 00
2 50	36 40. 8	125. 5	36 04. 6	126. 5	35 27. 9	127. 5	34 50. 8	128. 5	34 13. 2	129. 5	2 50
40	38 35. 4	127. 4	37 57. 8	128. 4	37 19. 7	129. 4	36 41. 1	130. 3	36 02. 1	131. 3	40
30	40 27. 2	129. 4	39 48. 1	130. 4	39 08. 3	131. 4	38 28. 2	132. 3	37 47. 6	133. 3	30
20	42 15. 7	131. 5	41 35. 0	132. 5	40 53. 7	133. 5	40 12. 0	134. 4	39 29. 7	135. 4	20
10	44 00. 7	133. 8	43 18. 2	134. 8	42 35. 2	135. 8	41 51. 8	136. 7	41 07. 9	137. 6	10
2 00	45 41. 5	136. 3	44 57. 3	137. 2	44 12. 6	138. 2	43 27. 6	139. 1	42 42. 0	140. 0	2 00
1 50	47 17. 8	138. 9	46 31. 8	139. 8	45 45. 4	140. 7	44 58. 7	141. 6	44 11. 4	142. 5	1 50
40	48 49. 0	141. 7	48 01. 2	142. 6	47 13. 1	143. 5	46 24. 6	144. 4	45 35. 6	145. 2	40
30	50 14. 6	144. 7	49 25. 0	145. 6	48 35. 0	146. 4	47 44. 8	147. 3	46 54. 2	148. 0	30
20	51 33. 6	147. 9	50 42. 3	148. 7	49 50. 7	149. 5	48 58. 8	150. 3	48 06. 6	151. 0	20
10	52 45. 9	151. 3	51 52. 8	152. 1	50 59. 5	152. 8	50 06. 0	153. 5	49 12. 1	154. 2	10
1 00	53 50. 3	154. 9	52 55. 7	155. 6	52 00. 9	156. 3	51 05. 9	156. 9	50 10. 5	157. 5	1 00
0 50	54 46. 5	158. 8	53 50. 4	159. 4	52 54. 1	160. 0	51 57. 6	160. 5	51 01. 0	161. 0	0 50
40	55 33. 5	162. 8	54 36. 2	163. 3	53 38. 6	163. 7	52 40. 9	164. 2	51 43. 1	164. 6	40
30	56 11. 0	166. 9	55 12. 4	167. 3	54 13. 9	167. 7	53 15. 1	168. 0	52 16. 3	168. 4	30
20	56 38. 0	171. 2	55 38. 7	171. 5	54 39. 3	171. 7	53 40. 0	172. 0	52 40. 5	172. 2	20
10	56 54. 5	175. 6	54 54. 7	175. 7	54 54. 8	175. 8	53 55. 0	176. 0	52 55. 1	176. 1	10
0 00	57 0. 0	180. 0	56 0. 0	180. 0	55 0. 0	180. 0	54 0. 0	180. 0	53 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 37.6	111.3	0 17.7	112.2							5 30
20	2 50.2	112.1	2 29.4	113.1	2 08.5	114.0	1 47.5	114.9	1 26.5	115.9	20
10	5 02.0	112.9	4 40.2	113.9	4 18.3	114.8	3 56.4	115.7	3 34.5	116.7	10
5 00	7 13.0	113.8	6 50.2	114.7	6 27.5	115.7	6 04.5	116.6	5 41.5	117.5	5 00
4 50	9 23.1	114.7	8 59.3	115.6	8 35.5	116.6	8 11.5	117.5	7 47.4	118.4	4 50
40	11 32.1	115.7	11 07.4	116.6	10 42.6	117.6	10 17.5	118.5	9 52.4	119.4	40
30	13 40.2	116.7	13 14.4	117.6	12 48.4	118.6	12 17.8	119.5	11 56.0	120.4	30
20	15 47.0	117.8	15 20.2	118.7	14 53.2	119.6	14 26.0	120.5	13 58.5	121.5	20
10	17 52.6	118.9	17 24.7	119.8	16 56.5	120.7	16 28.0	121.6	15 59.4	122.6	10
4 00	19 56.9	120.0	19 27.8	121.0	18 58.5	121.9	18 28.8	122.8	17 58.9	123.7	4 00
3 50	21 59.7	121.3	21 29.3	122.2	20 58.7	123.1	20 27.8	124.0	19 56.7	125.0	3 50
40	24 00.7	122.6	23 29.2	123.5	22 57.3	124.4	22 25.2	125.3	21 52.7	126.3	40
30	26 00.0	124.0	25 27.2	124.9	24 54.0	125.8	24 20.5	126.7	23 46.7	127.7	30
20	27 57.3	125.4	27 23.1	126.4	26 48.7	127.3	26 13.8	128.2	25 38.7	129.1	20
10	29 52.5	127.0	29 16.9	127.9	28 41.1	128.9	28 04.7	129.7	27 28.2	130.6	10
3 00	31 45.2	128.6	31 08.2	129.5	30 30.9	130.5	29 53.2	131.3	29 15.2	132.2	3 00
2 50	33 35.3	130.4	32 56.8	131.3	32 18.0	132.2	31 38.9	133.1	30 59.3	134.0	2 50
40	35 22.5	132.2	34 42.5	133.1	34 02.3	134.0	33 21.6	134.9	32 40.4	135.8	40
30	37 06.6	134.2	36 25.0	135.1	35 43.2	136.0	35 00.8	136.9	34 18.3	137.8	30
20	38 47.1	136.3	38 03.9	137.1	37 20.5	138.0	36 36.7	138.9	35 52.5	139.8	20
10	40 23.7	138.5	39 38.9	139.3	38 53.8	140.2	38 08.4	141.1	37 22.7	141.9	10
2 00	41 56.1	140.8	41 09.7	141.7	40 23.1	142.5	39 36.0	143.3	38 48.6	144.1	2 00
1 50	43 23.7	143.3	42 35.7	144.2	41 47.4	145.0	40 58.7	145.8	40 09.8	146.5	1 50
40	44 46.3	146.0	43 56.6	146.8	43 06.7	147.5	42 16.5	148.3	41 25.9	149.0	40
30	46 03.2	148.8	45 11.8	149.6	44 20.4	150.3	43 28.6	151.0	42 36.6	151.7	30
20	47 13.9	151.8	46 21.2	152.4	45 28.1	153.1	44 34.8	153.8	43 41.3	154.4	20
10	48 18.1	154.9	47 23.7	155.5	46 29.3	156.1	45 34.6	156.7	44 39.7	157.3	10
1 00	49 15.0	158.1	48 19.3	158.7	47 23.5	159.2	46 27.5	159.8	45 31.4	160.3	1 00
0 50	50 04.2	161.5	49 07.2	162.0	48 10.2	162.5	47 13.2	162.9	46 15.9	163.4	0 50
40	50 45.3	165.1	49 47.2	165.5	48 49.2	165.8	47 51.1	166.2	46 52.9	166.6	40
30	51 17.6	168.7	50 18.7	169.0	49 19.9	169.3	48 21.0	169.5	47 22.0	169.9	30
20	51 41.1	172.4	50 41.6	172.6	49 42.1	172.8	48 42.5	173.0	47 43.0	173.2	20
10	51 55.3	176.2	50 55.4	176.3	49 55.5	176.4	48 55.6	176.5	47 55.7	176.6	10
0 00	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 19.6	89.1	0 39.0	88.1	0 58.5	87.2	1 18.1	86.2	6 00
5 50	2 21.8	90.8	2 41.4	89.9	3 00.8	88.9	3 20.3	88.0	3 39.7	87.0	5 50
40	4 43.6	91.6	5 03.2	90.7	5 22.6	89.7	5 42.0	88.8	6 01.4	87.8	40
30	7 05.4	92.4	7 25.0	91.5	7 44.3	90.5	8 03.8	89.6	8 23.1	88.6	30
20	9 27.0	93.3	9 46.8	92.3	10 06.2	91.4	10 25.6	90.4	10 44.9	89.5	20
10	11 48.5	94.1	12 08.5	93.2	12 28.0	92.2	12 47.6	91.2	13 06.8	90.3	10
5 00	14 09.9	95.0	14 49.7	94.0	14 09.2	93.0	15 28.6	92.1	15 47.6	91.1	5 00
4 50	16 31.2	95.9	16 51.4	94.9	17 11.2	93.9	17 31.0	92.9	17 50.2	91.9	4 50
40	18 52.1	96.8	19 12.6	95.8	19 32.6	94.8	19 52.5	93.8	20 12.0	92.8	40
30	21 12.8	97.7	21 33.6	96.7	21 53.9	95.7	22 14.0	94.6	22 33.6	93.6	30
20	23 33.1	98.6	23 54.4	97.6	24 14.9	96.6	24 35.2	95.6	24 55.1	94.5	20
10	25 53.2	99.6	26 14.8	98.6	26 35.7	97.5	26 56.3	96.5	27 16.4	95.4	10
4 00	28 12.8	100.7	28 34.8	99.6	28 56.1	98.5	29 17.0	97.5	29 37.5	96.4	4 00
3 50	30 32.0	101.7	30 54.3	100.6	31 16.2	99.5	31 37.6	98.5	31 58.2	97.4	3 50
40	32 50.5	102.8	33 16.3	101.7	33 35.8	100.6	33 57.6	99.5	34 18.8	98.4	40
30	35 08.5	104.0	35 32.1	102.9	35 55.0	101.8	36 17.2	100.6	36 38.9	99.5	30
20	37 25.7	105.3	37 49.9	104.1	38 13.4	103.0	38 36.3	101.8	38 58.6	100.6	20
10	39 42.0	106.6	40 07.2	105.4	40 31.4	104.2	40 55.0	103.0	41 17.8	101.8	10
3 00	41 57.5	108.0	42 23.4	106.8	42 48.4	105.6	43 12.6	104.3	43 36.2	103.1	3 00
2 50	44 11.7	109.6	44 38.5	108.3	45 04.8	107.1	45 29.8	105.8	45 53.9	104.5	2 50
40	46 24.7	111.2	46 52.7	109.9	47 19.5	108.6	47 45.6	107.3	48 10.9	105.9	40
30	48 36.1	113.0	49 05.2	111.6	49 33.2	110.3	50 00.5	108.9	50 26.6	107.5	30
20	50 45.7	114.9	51 16.2	113.5	51 45.4	112.2	52 13.8	110.7	52 41.3	109.3	20
10	52 53.2	117.1	53 25.1	115.6	53 55.9	114.2	54 25.9	112.7	54 54.1	111.2	10
2 00	54 58.2	119.4	55 31.8	118.0	56 04.0	116.5	56 35.3	114.9	57 05.6	113.4	2 00
1 50	57 00.0	122.0	57 35.5	120.5	58 09.6	119.0	58 42.6	117.4	59 14.5	115.8	1 50
40	58 58.4	124.9	59 36.0	123.4	60 11.9	121.8	60 47.0	120.2	61 20.9	118.5	40
30	60 52.3	128.2	61 32.0	126.6	62 10.5	125.0	62 47.8	123.3	63 23.8	121.5	30
20	62 41.1	131.8	63 23.3	130.2	64 04.0	128.6	64 43.7	126.8	65 22.5	125.0	20
10	64 23.2	135.9	65 08.1	134.3	65 51.8	132.7	66 34.2	130.9	67 15.5	129.1	10
1 00	65 57.9	140.5	66 45.7	139.0	67 32.0	137.4	68 17.4	135.7	69 02.0	133.8	1 00
0 50	67 23.1	145.8	68 13.6	144.3	69 03.0	142.8	69 51.9	141.1	70 39.5	139.3	0 50
40	68 37.0	151.6	69 30.5	150.3	70 22.7	148.9	71 14.7	147.3	72 06.1	145.7	40
30	69 37.4	158.0	70 33.5	156.9	71 28.9	155.8	72 23.9	154.5	73 18.5	153.1	30
20	70 22.6	165.0	71 20.9	164.2	72 18.4	163.3	73 16.1	162.4	74 13.8	161.4	20
10	70 50.5	172.4	71 50.0	172.0	72 49.4	171.5	73 48.8	171.0	74 48.1	170.5	10
0 00	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 15.4	81.7	0 35.1	80.7	6 10
6 00	1 37.6	85.3	1 57.0	84.3	2 16.4	83.4	2 35.8	82.4	2 55.2	81.5	6 00
5 50	3 59.1	86.1	4 18.2	85.1	4 37.5	84.2	4 56.5	83.2	5 15.5	82.3	5 50
40	6 20.5	86.9	6 39.6	85.9	6 58.6	85.0	7 17.5	84.0	7 36.3	83.1	40
30	8 42.1	87.7	9 01.1	86.7	9 19.9	85.8	9 38.6	84.8	9 57.1	83.8	30
20	11 04.0	88.5	11 22.8	87.5	11 41.5	86.6	12 00.0	85.6	12 18.3	84.6	20
10	13 25.8	89.3	13 44.6	88.3	14 03.1	87.3	14 21.4	86.3	14 39.5	85.4	10
5 00	15 47.6	90.1	16 06.4	89.1	16 24.8	88.1	16 43.0	87.1	17 00.9	86.1	5 00
4 50	18 09.4	90.9	18 28.2	89.9	18 46.5	88.9	19 04.7	87.9	19 22.5	86.9	4 50
40	20 31.2	91.7	20 50.0	90.7	21 08.4	89.7	21 26.5	88.7	21 44.2	87.7	40
30	22 52.9	92.6	23 11.8	91.5	23 30.3	90.5	23 48.3	89.5	24 05.9	88.4	30
20	25 14.6	93.5	25 33.5	92.4	25 52.0	91.4	26 10.1	90.3	26 27.7	89.2	20
10	27 36.1	94.4	27 55.1	93.3	28 13.8	92.2	28 31.9	91.1	28 49.5	90.0	10
4 00	29 57.3	95.3	30 16.7	94.2	30 35.4	93.1	30 53.7	92.0	31 11.4	90.9	4 00
3 50	32 18.4	96.2	32 38.0	95.1	32 57.0	94.0	33 15.3	92.9	33 33.2	91.7	3 50
40	34 39.3	97.2	34 59.2	96.1	35 18.4	94.9	35 37.0	93.8	35 54.9	92.6	40
30	36 59.8	98.3	37 20.0	97.1	37 39.6	95.9	37 58.4	94.7	38 16.5	93.5	30
20	39 20.0	99.4	39 40.6	98.2	40 00.5	96.9	40 19.7	95.7	40 38.0	94.4	20
10	41 39.8	100.6	42 00.8	99.3	42 21.2	98.0	42 40.7	96.7	42 59.3	95.4	10
3 00	43 58.9	101.8	44 20.6	100.5	44 41.4	99.2	45 01.3	97.8	45 20.3	96.5	3 00
2 50	46 17.3	103.1	46 39.6	101.8	47 01.1	100.4	47 21.7	99.0	47 41.0	97.6	2 50
40	48 35.1	104.5	48 58.2	103.1	49 20.4	101.7	49 41.4	100.3	50 01.5	98.8	40
30	50 51.8	106.1	51 15.9	104.6	51 38.8	103.1	52 00.8	101.7	52 21.2	100.1	30
20	53 07.6	107.8	53 32.6	106.3	53 56.5	104.7	54 19.3	103.1	54 40.7	101.5	20
10	55 21.9	109.7	55 48.1	108.1	56 13.1	106.4	56 36.9	104.8	56 59.1	103.1	10
2 00	57 34.7	111.7	58 02.2	110.1	58 28.5	108.3	58 53.5	106.6	59 16.9	104.8	2 00
1 50	59 45.1	114.1	60 14.2	112.3	60 42.3	110.5	61 08.6	108.6	61 33.3	106.7	1 50
40	61 53.5	116.7	62 24.5	114.9	62 54.0	113.0	63 22.0	111.0	63 48.4	109.0	40
30	63 58.5	119.7	64 31.5	117.8	65 03.2	115.8	65 33.2	113.7	66 01.5	111.5	30
20	65 59.6	123.1	66 35.3	121.1	67 09.1	119.0	67 41.6	116.8	68 12.0	114.5	20
10	67 55.5	127.1	68 34.0	125.1	69 10.8	122.9	69 45.8	120.5	70 19.2	118.1	10
1 00	69 45.1	131.8	70 26.8	129.7	71 06.9	127.4	71 45.3	125.1	72 21.7	122.5	1 00
0 50	71 26.2	137.3	72 11.5	135.3	72 55.3	132.9	73 37.3	130.5	74 17.5	127.8	0 50
40	72 56.5	143.8	73 45.5	141.9	74 33.3	139.7	75 19.9	137.2	76 04.5	134.5	40
30	74 12.2	151.5	75 05.0	149.7	75 57.3	147.8	76 48.3	145.5	77 38.0	143.0	30
20	75 10.5	160.2	76 07.1	158.8	77 03.2	157.3	77 58.7	155.5	78 53.3	153.5	20
10	75 47.4	169.9	76 46.5	169.1	77 45.4	168.2	78 44.1	167.2	79 42.6	166.0	10
0 00	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 54.7	79.7	1 14.3	78.8	1 34.1	77.8	1 53.7	76.9	2 13.2	75.9	6 10
6 00	3 14.5	80.5	3 33.7	79.6	3 52.9	78.6	4 12.0	77.7	4 31.0	76.7	6 00
5 50	5 34.5	81.3	5 53.3	80.4	6 12.2	79.4	6 30.8	78.5	6 49.4	77.5	5 50
40	7 54.9	82.1	8 13.3	81.1	8 31.7	80.2	8 49.9	79.2	9 07.9	78.3	40
30	10 15.4	82.8	10 33.6	81.9	10 51.6	80.9	11 09.4	79.9	11 27.0	79.0	30
20	12 36.3	83.6	12 54.1	82.6	13 11.8	81.7	13 29.2	80.7	13 46.3	79.7	20
10	14 57.4	84.4	15 14.9	83.4	15 32.3	82.4	15 49.4	81.4	16 06.1	80.4	10
5 00	17 18.6	85.1	17 35.9	84.1	17 52.9	83.1	18 09.7	82.1	18 26.0	81.1	5 00
4 50	19 39.9	85.9	19 57.0	84.8	20 13.8	83.8	20 30.2	82.8	20 46.4	81.8	4 50
40	22 01.5	86.6	22 18.4	85.6	22 35.0	84.6	22 51.0	83.5	23 06.7	82.5	40
30	24 23.1	87.4	24 39.8	86.3	24 56.2	85.3	25 12.1	84.2	25 27.5	83.1	30
20	26 44.9	88.2	27 01.4	87.1	27 17.6	86.0	27 33.3	84.9	27 48.4	83.8	20
10	29 06.6	89.0	29 23.1	87.9	29 39.1	86.8	29 54.6	85.6	30 09.4	84.5	10
4 00	31 28.5	89.8	31 44.9	88.6	32 00.8	87.5	32 16.1	86.3	32 30.7	85.2	4 00
3 50	33 50.3	90.6	34 06.7	89.4	34 22.6	88.2	34 37.4	87.1	34 52.1	85.9	3 50
40	36 12.1	91.4	36 28.5	90.2	36 44.3	89.0	36 59.3	87.8	37 13.7	86.6	40
30	38 33.8	92.3	38 50.3	91.1	39 06.2	89.8	39 21.1	88.5	39 35.2	87.3	30
20	40 55.6	93.2	41 12.1	91.9	41 28.0	90.6	41 42.9	89.3	41 56.9	88.0	20
10	43 17.0	94.1	43 33.8	92.8	43 49.8	91.5	44 04.8	90.1	44 18.8	88.8	10
3 00	45 38.5	95.1	45 55.4	93.8	46 11.5	92.4	46 26.6	91.0	46 40.5	89.6	3 00
2 50	47 59.6	96.2	48 16.8	94.8	48 33.1	93.3	48 48.4	91.8	49 02.4	90.4	2 50
40	50 20.4	97.3	50 38.0	95.8	50 54.7	94.3	51 10.0	92.8	51 24.2	91.2	40
30	52 40.8	98.6	52 59.0	97.0	53 16.0	95.4	53 31.6	93.8	53 45.9	92.1	30
20	55 00.9	99.9	55 19.5	98.2	55 37.1	96.6	55 53.1	94.8	56 07.6	93.1	20
10	57 20.2	101.3	57 39.6	99.6	57 57.7	97.8	58 15.0	96.0	58 30.0	94.1	10
2 00	59 39.0	103.0	59 59.2	101.1	60 18.1	99.2	60 35.4	97.3	60 50.5	95.3	2 00
1 50	61 56.6	104.8	62 17.9	102.8	62 37.7	100.8	62 55.5	98.7	63 11.6	96.6	1 50
40	64 13.2	106.9	64 35.7	104.7	64 56.6	102.6	65 15.6	100.3	65 32.2	98.0	40
30	66 27.8	109.3	66 52.0	107.0	67 14.5	104.6	67 34.8	102.2	67 52.5	99.7	30
20	68 40.6	112.2	69 06.8	109.6	69 31.0	107.1	69 52.8	104.4	70 11.7	101.6	20
10	70 50.2	115.6	71 19.0	112.8	71 45.4	110.0	72 09.2	107.0	72 30.2	104.9	10
1 00	72 56.2	119.7	73 27.8	116.8	73 57.2	113.7	74 23.7	110.4	74 46.6	106.9	1 00
0 50	74 56.0	124.9	75 31.5	121.8	76 04.7	118.4	76 34.5	114.7	77 01.0	110.8	0 50
40	76 47.7	131.6	77 27.7	128.3	78 06.0	124.6	78 40.7	120.6	79 11.3	116.1	40
30	78 26.4	140.1	79 12.7	136.8	79 56.7	133.0	80 37.5	128.7	81 15.0	123.7	30
20	79 47.0	151.0	80 39.4	148.2	81 30.1	144.8	82 18.7	140.6	83 04.4	135.5	20
10	80 40.9	164.6	81 38.6	162.9	82 35.9	160.7	83 32.3	157.8	84 27.3	154.0	10
0 00	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 16.0	74.2	0 36.2	73.3	0 56.3	72.3	1 16.4	71.4	1 36.5	70.4	6 20
10	2 32.8	75.0	2 52.2	74.1	3 11.8	73.1	3 31.1	72.2	3 50.5	71.2	10
6 00	4 50.0	75.8	5 08.9	74.8	5 27.7	73.9	5 46.5	72.9	6 05.1	72.0	6 00
5 50	7 07.5	76.6	7 26.0	75.6	7 44.2	74.6	8 02.2	73.7	8 20.2	72.7	5 50
40	9 25.9	77.3	9 43.6	76.3	10 01.2	75.3	10 18.6	74.4	10 35.9	73.4	40
30	11 44.4	78.0	12 01.6	77.0	12 18.7	76.0	12 35.3	75.0	12 52.0	74.1	30
20	14 03.3	78.7	14 20.0	77.7	14 36.5	76.7	14 52.7	75.7	15 08.6	74.7	20
10	16 22.6	79.4	16 38.7	78.4	16 54.7	77.4	17 10.4	76.4	17 25.6	75.4	10
5 00	18 42.1	80.1	18 57.8	79.1	19 13.3	78.0	19 28.3	77.0	19 43.0	76.0	5 00
4 50	21 01.9	80.8	21 17.2	79.7	21 32.1	78.7	21 46.6	77.6	22 00.8	76.6	4 50
40	23 22.0	81.4	23 36.9	80.4	23 51.4	79.3	22 05.4	78.2	22 19.0	77.2	40
30	25 42.4	82.1	25 56.8	81.0	26 10.9	79.9	26 24.4	78.8	26 37.3	77.7	30
20	28 03.0	82.7	28 17.1	81.6	28 30.6	80.5	28 43.6	79.4	28 56.1	78.3	20
10	30 23.8	83.4	30 37.4	82.2	30 50.7	81.1	31 03.2	80.0	31 15.1	78.8	10
4 00	32 44.7	84.0	32 58.1	82.9	33 10.9	81.7	33 23.0	80.5	33 34.4	79.3	4 00
3 50	35 05.9	84.7	35 18.9	83.5	35 31.3	82.3	35 42.9	81.1	35 53.8	79.9	3 50
40	37 27.2	85.4	37 39.9	84.1	37 52.0	82.9	38 03.2	81.6	38 13.6	80.4	40
30	39 48.6	86.0	40 01.0	84.8	40 12.8	83.5	40 23.6	82.2	40 33.5	80.9	30
20	42 10.1	86.7	42 22.4	85.4	42 33.8	84.1	42 44.2	82.7	42 53.7	81.4	20
10	44 31.8	87.4	44 43.8	86.0	44 54.9	84.7	45 04.8	83.3	43 14.0	81.9	10
3 00	46 53.5	88.1	47 05.3	86.7	47 16.2	85.2	47 25.9	83.8	47 34.5	82.3	3 00
2 50	49 15.1	88.9	49 26.9	87.4	49 37.6	85.8	49 46.9	84.3	49 55.1	82.8	2 50
40	51 37.1	89.7	51 48.7	88.1	51 59.1	86.5	52 08.2	84.9	52 15.9	83.3	40
30	53 59.0	90.5	54 10.5	88.8	54 20.6	87.1	54 29.4	85.4	54 36.7	83.7	30
20	56 20.7	91.3	56 32.3	89.6	56 42.4	87.8	56 50.9	86.0	56 57.8	84.1	20
10	58 42.4	92.3	58 54.1	90.4	59 04.1	88.5	59 12.1	86.5	59 18.8	84.6	10
2 00	61 04.1	93.3	61 15.9	91.2	61 25.9	89.2	61 34.0	87.1	61 40.3	85.0	2 00
1 50	63 25.6	94.4	63 37.5	92.2	63 47.9	90.0	63 55.7	87.7	64 01.5	85.5	1 50
40	65 46.9	95.6	65 59.4	93.2	66 09.7	90.8	66 17.5	88.4	66 23.0	85.9	40
30	68 07.9	97.1	68 20.9	94.4	68 31.2	91.7	68 39.2	89.0	68 44.5	86.3	30
20	70 28.4	98.7	70 42.1	95.8	70 53.2	92.8	71 01.2	89.8	71 06.0	86.7	20
10	72 48.2	100.8	73 02.8	97.5	73 14.8	94.0	73 22.8	90.6	73 27.7	87.1	10
1 00	75 06.9	103.3	75 23.2	99.5	75 36.1	95.5	75 44.9	91.6	75 49.3	87.6	1 00
0 50	77 24.0	106.6	77 42.7	102.2	77 57.0	97.5	78 06.0	92.8	78 11.0	88.0	0 50
40	79 38.3	111.2	80 00.3	105.9	80 17.0	100.3	80 27.8	94.4	80 32.8	88.4	40
30	81 47.0	118.0	82 14.5	111.6	82 35.5	104.5	82 49.0	96.8	82 54.0	88.8	30
20	83 46.0	129.2	84 22.0	121.4	84 50.5	112.0	85 09.2	101.1	85 16.4	89.2	20
10	85 20.5	148.8	86 10.0	141.1	86 53.6	129.7	87 25.6	112.5	87 38.2	89.6	10
0 00	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30			0 05.0	67.7	0 25.8	66.8	0 46.7	65.9	1 07.7	64.9	6 30
20	1 56.6	69.5	2 16.7	68.6	2 36.7	67.6	2 56.6	66.7	3 16.6	65.7	20
10	4 09.8	70.3	4 29.1	69.3	4 48.1	68.4	5 07.1	67.4	5 26.2	66.5	10
6 00	6 23.6	71.0	6 42.0	70.1	7 00.3	69.1	7 18.5	68.1	7 36.5	67.2	6 00
5 50	8 37.9	71.7	8 55.6	70.8	9 13.1	69.8	9 30.4	68.8	9 47.6	67.9	5 50
40	10 52.9	72.4	11 09.8	71.5	11 26.4	70.5	11 43.0	69.5	11 59.2	68.5	40
30	13 08.3	73.1	13 24.5	72.1	13 40.3	71.1	13 56.0	70.1	14 11.6	69.1	30
20	15 24.3	73.7	15 39.7	72.7	15 54.8	71.7	16 09.7	70.7	16 24.2	69.7	20
10	17 40.6	74.3	17 55.4	73.3	18 09.7	72.3	18 23.7	71.3	18 37.5	70.3	10
5 00	19 57.4	74.9	20 11.4	73.9	20 25.0	72.9	20 38.3	71.8	20 51.2	70.8	5 00
4 50	22 14.5	75.5	22 27.9	74.5	22 40.7	73.4	22 53.2	72.4	23 05.4	71.3	4 50
40	24 32.0	76.1	24 44.7	75.0	24 56.8	73.9	25 08.6	72.9	25 19.8	71.8	40
30	26 49.7	76.6	27 01.9	75.5	27 13.2	74.4	27 24.2	73.3	27 34.7	72.2	30
20	29 08.8	77.2	29 19.4	76.0	29 30.1	74.9	29 40.3	73.8	29 50.0	72.7	20
10	31 26.3	77.7	31 37.2	76.5	31 47.1	75.4	31 56.6	74.2	32 05.4	73.1	10
4 00	33 45.1	78.2	33 55.2	77.0	34 04.6	75.8	34 13.2	74.6	34 21.2	73.4	4 00
3 50	36 04.0	78.7	36 13.5	77.4	36 22.1	76.2	36 30.2	75.0	36 37.3	73.7	3 50
40	38 23.3	79.2	38 32.0	77.9	38 40.0	76.6	38 47.3	75.3	38 53.5	74.1	40
30	40 42.6	79.6	40 50.9	78.3	40 58.2	77.0	41 04.5	75.7	41 10.0	74.4	30
20	43 02.2	80.0	43 09.7	78.7	43 16.3	77.3	43 22.0	75.9	43 26.6	74.6	20
10	45 22.0	80.4	45 29.0	79.0	45 34.7	77.6	45 39.7	76.2	45 43.5	74.8	10
3 00	47 41.9	80.9	47 48.2	79.4	47 53.4	77.9	47 57.4	76.4	48 00.2	74.9	3 00
2 50	50 01.9	81.2	50 07.7	79.7	50 12.2	78.1	50 15.3	76.6	50 17.2	75.0	2 50
40	52 22.3	81.6	52 27.3	80.0	52 30.9	78.4	52 33.3	76.7	52 34.3	75.1	40
30	54 42.5	82.0	54 47.0	80.2	54 49.8	78.5	54 51.4	76.8	54 51.3	75.0	30
20	57 03.1	82.3	57 06.8	80.5	57 08.9	78.6	57 09.4	76.8	57 08.3	74.9	20
10	59 23.7	82.6	59 27.1	80.7	59 27.8	78.7	59 27.4	76.7	59 25.2	74.8	10
2 00	61 44.3	82.9	61 46.7	80.8	61 47.0	78.7	61 45.4	76.6	61 41.9	74.5	2 00
1 50	64 05.0	83.2	64 06.7	80.9	64 06.2	78.6	64 03.4	76.3	63 58.5	74.0	1 50
40	66 26.0	83.4	66 26.7	80.9	66 25.1	78.4	66 21.0	75.9	66 14.5	73.4	40
30	68 47.0	83.5	68 46.7	80.8	68 43.7	78.0	68 38.2	75.3	68 30.4	72.6	30
20	71 08.0	83.6	71 06.7	80.5	71 02.6	77.4	70 55.4	74.4	70 45.1	71.4	20
10	73 28.7	83.6	73 26.6	80.1	73 20.5	76.6	73 11.5	73.2	72 59.0	69.9	10
1 00	75 49.8	83.5	75 46.1	79.4	75 38.3	75.4	75 26.6	71.5	75 11.0	67.7	1 00
0 50	78 10.5	83.1	78 05.5	78.3	77 55.0	73.5	77 40.0	68.9	77 21.0	64.5	0 50
40	80 31.3	82.3	80 23.7	76.3	80 09.8	70.5	79 50.4	65.1	79 26.3	59.9	40
30	82 51.5	80.7	82 40.5	72.9	82 21.5	65.6	81 56.0	59.0	81 25.5	53.0	30
20	85 10.9	77.2	84 53.6	66.1	84 26.2	56.5	83 51.2	48.5	83 10.3	42.0	20
10	87 26.4	66.6	86 54.9	49.2	86 11.7	37.6	85 22.1	29.8	84 29.1	24.5	10
0 00	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	85 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 21.8	90.8	2 02.2	91.8	1 42.6	92.7	1 23.1	93.7	1 03.4	94.6	5 50
40	4 36.3	91.6	4 24.0	92.6	4 04.2	93.5	3 44.5	94.5	3 24.7	95.4	40
30	7 05.4	92.4	6 45.6	93.4	6 25.6	94.3	6 05.8	95.3	5 45.8	96.2	30
20	9 27.0	93.3	9 07.2	94.3	8 47.0	95.2	8 26.8	96.2	8 06.5	97.1	20
10	11 48.5	94.1	11 28.6	95.1	11 08.2	96.1	10 47.9	97.1	10 27.2	98.0	10
5 00	14 09.9	95.0	13 49.7	96.0	13 29.1	96.9	13 08.4	97.9	12 47.5	98.9	5 00
4 50	16 31.2	95.9	16 10.7	96.9	15 49.8	97.8	15 28.8	98.8	15 07.4	99.8	4 50
40	18 52.2	96.8	18 31.3	97.8	18 10.1	98.8	17 48.7	99.7	17 27.0	100.7	40
30	21 12.8	97.7	20 51.8	98.7	20 30.1	99.7	20 08.3	100.7	19 46.2	101.7	30
20	23 33.1	98.6	23 11.7	99.7	22 49.7	100.7	22 27.4	101.7	22 04.8	102.7	20
10	25 53.2	99.6	25 31.3	100.7	25 08.9	101.7	24 46.2	102.7	24 22.9	103.7	10
4 00	28 12.8	100.7	27 50.4	101.7	27 27.5	102.7	27 04.1	103.8	26 40.4	104.8	4 00
3 50	30 32.0	101.7	30 09.0	102.8	29 44.5	103.8	29 22.6	104.9	28 57.1	106.0	3 50
40	32 50.5	102.8	32 27.0	103.9	32 02.8	105.0	31 38.2	106.1	31 13.1	107.2	40
30	35 08.5	104.0	34 44.3	105.1	34 19.5	106.3	33 54.1	107.4	33 28.1	108.5	30
20	37 25.7	105.3	37 00.8	106.4	36 35.1	107.6	36 08.9	108.7	35 42.1	109.8	20
10	39 42.0	106.6	39 16.4	107.8	38 49.9	109.0	38 22.8	110.1	37 55.0	111.3	10
3 00	41 57.5	108.0	41 30.9	109.2	41 03.4	110.4	40 35.2	111.6	40 06.5	112.8	3 00
2 50	44 11.7	109.6	43 44.1	110.8	43 15.7	112.0	42 46.5	113.2	42 16.5	114.4	2 50
40	46 24.7	111.2	45 56.0	112.5	45 26.3	113.7	44 55.9	115.0	44 24.8	116.2	40
30	48 36.1	113.0	48 06.1	114.3	47 35.2	115.6	47 03.6	116.9	46 31.0	118.1	30
20	50 45.7	114.9	50 14.4	116.3	49 42.0	117.6	49 08.9	118.9	48 35.0	120.1	20
10	52 53.2	117.1	52 20.5	118.5	51 46.6	119.8	51 12.0	121.1	50 36.2	122.4	10
2 00	54 58.2	119.4	54 23.7	120.8	53 48.0	122.2	53 11.6	123.6	52 34.4	124.9	2 00
1 50	57 00.0	122.0	56 23.8	123.5	55 46.2	124.9	55 08.0	126.3	54 28.9	127.6	1 50
40	58 58.4	124.9	58 20.2	126.4	57 40.5	127.8	57 00.2	129.2	56 19.0	130.5	40
30	60 52.3	128.2	60 11.9	129.7	59 30.2	131.1	58 47.6	132.5	58 04.2	133.8	30
20	62 41.1	131.8	61 58.1	133.3	61 14.0	134.8	60 29.1	136.1	59 43.5	137.4	20
10	64 23.2	135.9	63 37.8	137.4	62 51.2	138.8	62 03.9	140.1	61 15.8	141.4	10
1 00	65 57.9	140.5	65 09.6	142.0	64 20.3	143.3	63 30.4	144.6	62 40.1	145.8	1 00
0 50	67 23.1	145.8	66 32.0	147.1	65 40.1	148.3	64 48.0	149.5	63 54.9	150.6	0 50
40	68 37.0	151.6	67 43.3	152.8	66 48.6	153.9	65 53.9	154.9	64 58.9	155.8	40
30	69 37.4	158.0	68 41.2	159.0	67 44.6	159.9	66 47.8	160.7	65 50.8	161.5	30
20	70 22.6	165.0	69 24.5	165.6	68 25.9	166.3	67 27.3	166.9	66 28.6	167.4	20
10	70 50.5	172.4	69 51.0	172.7	68 51.4	173.1	67 51.8	173.4	66 52.2	173.6	10
0 00	71 0.0	180.0	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 43.8	95.6	0 24.1	96.5	0 04.4	97.4					5 50
40	3 04.8	96.4	2 44.8	97.3	2 24.8	98.3	2 04.8	99.2	1 44.7	100.2	40
30	5 25.6	97.2	5 05.3	98.1	4 45.1	99.1	4 24.6	100.0	4 04.1	101.0	30
20	7 46.2	98.1	7 25.6	99.0	7 04.9	100.0	6 44.1	100.9	6 23.3	101.8	20
10	10 06.5	98.9	9 45.5	99.9	9 24.5	100.8	9 03.2	101.8	8 41.8	102.7	10
5 00	12 26.4	99.8	12 05.1	100.8	11 43.5	101.7	11 21.8	102.7	10 59.9	103.6	5 00
4 50	14 45.9	100.7	14 24.2	101.7	14 02.2	102.6	13 39.9	103.6	13 17.4	104.5	4 50
40	17 05.1	101.7	16 42.2	102.6	16 20.2	103.6	15 57.5	104.6	15 34.4	105.5	40
30	19 23.7	102.7	19 00.9	103.6	18 37.9	104.6	18 14.4	105.6	17 50.7	106.5	30
20	21 41.8	103.7	21 18.5	104.7	20 54.7	105.7	20 30.7	106.6	20 06.3	107.6	20
10	23 59.3	104.7	23 35.3	105.7	23 11.0	106.7	22 46.1	107.7	22 21.1	108.7	10
4 00	26 16.1	105.8	25 51.5	106.8	25 26.3	107.9	25 00.8	108.9	24 35.0	109.9	4 00
3 50	28 32.1	107.0	28 06.8	108.0	27 40.9	109.1	27 14.5	110.1	26 47.8	111.1	3 50
40	30 47.4	108.2	30 21.2	109.3	29 54.4	110.3	29 27.3	111.3	28 59.6	112.3	40
30	33 01.6	109.5	32 34.5	110.6	32 07.0	111.6	31 38.8	112.7	31 10.2	113.7	30
20	35 14.7	110.8	34 46.7	111.9	34 18.1	113.0	33 49.1	114.1	33 19.4	115.1	20
10	37 26.6	112.3	36 57.6	113.4	36 28.0	114.5	35 57.7	115.6	35 26.9	116.6	10
3 00	39 37.1	113.9	39 07.0	115.0	38 36.1	116.1	38 04.8	117.2	37 32.9	118.2	3 00
2 50	41 45.9	115.5	41 14.5	116.7	40 42.6	117.8	40 10.0	118.9	39 36.7	120.0	2 50
40	43 53.0	117.3	43 20.3	118.5	42 47.0	119.6	42 13.0	120.7	41 38.5	121.8	40
30	45 57.8	119.3	45 23.8	120.5	44 49.1	121.6	44 13.7	122.7	43 37.5	123.8	30
20	48 00.3	121.4	47 24.8	122.6	46 48.5	123.7	46 11.6	124.9	45 34.0	126.0	20
10	49 59.9	123.7	49 22.8	124.9	48 44.9	126.0	48 06.2	127.2	47 27.0	128.3	10
2 00	51 56.4	126.1	51 17.4	127.3	50 37.7	128.5	49 57.5	129.7	49 16.4	130.8	2 00
1 50	53 48.8	128.8	53 08.0	130.1	52 26.7	131.3	51 44.3	132.4	51 01.5	133.5	1 50
40	55 37.1	131.8	54 54.4	133.0	54 10.7	134.2	53 26.7	135.4	52 41.9	136.5	40
30	57 20.1	135.1	56 35.2	136.3	55 49.7	137.5	55 03.4	138.6	54 16.7	139.7	30
20	58 57.2	138.7	58 10.2	139.9	57 22.3	141.0	56 34.1	142.1	55 45.3	143.1	20
10	60 27.1	142.6	59 37.8	143.7	58 48.0	145.8	57 57.5	145.9	57 06.6	146.8	10
1 00	61 49.1	146.9	60 57.5	148.0	60 05.4	149.0	59 13.0	150.0	58 20.1	150.9	1 00
0 50	63 01.6	151.6	62 07.9	150.6	61 13.9	153.5	60 19.1	154.4	59 24.4	155.2	0 50
40	64 03.5	156.7	63 07.8	157.5	62 11.6	158.3	61 15.4	159.1	60 11.8	159.7	40
30	64 53.2	162.2	63 55.6	162.8	62 58.1	163.4	62 00.3	164.0	61 02.3	164.6	30
20	65 30.0	167.9	64 31.2	168.4	63 32.2	168.8	62 33.3	169.2	61 34.2	169.6	20
10	65 52.5	173.9	64 52.8	174.1	63 53.0	174.4	62 53.3	174.6	61 53.5	174.8	10
0 00	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 24.7	101.1	1 04.5	102.0	0 44.5	103.0	0 24.3	103.9	0 04.1	104.8	5 40
30	3 43.6	101.9	3 23.0	102.8	3 02.4	103.8	2 41.6	104.8	2 21.0	105.7	30
20	6 02.2	102.8	5 41.0	103.7	5 19.8	104.7	4 58.6	105.6	4 37.2	106.5	20
10	8 20.3	103.7	7 58.6	104.6	7 36.9	105.6	7 14.9	106.5	6 53.0	107.4	10
5 00	10 37.8	104.6	10 15.5	105.5	9 53.1	106.5	9 30.6	107.4	9 07.8	108.3	5 00
4 50	12 54.7	105.5	12 31.9	106.4	12 08.8	107.4	11 45.6	108.3	11 22.1	109.3	4 50
40	15 11.1	106.5	14 47.6	107.4	14 23.8	108.4	13 59.8	109.3	13 35.5	110.3	40
30	17 26.7	107.5	17 02.4	108.4	16 38.0	109.4	16 13.1	110.3	15 48.1	111.3	30
20	19 41.6	108.6	19 16.6	109.5	18 51.3	110.5	18 25.7	111.4	17 59.8	112.4	20
10	21 55.6	109.7	21 29.8	110.6	21 03.6	111.6	20 37.1	112.5	20 10.4	113.5	10
4 00	24 08.7	110.8	23 42.0	111.8	23 14.9	112.8	22 47.6	113.7	22 19.8	114.7	4 00
3 50	26 20.7	112.0	25 53.1	113.0	25 25.2	114.0	24 56.8	115.0	24 28.1	116.0	3 50
40	28 31.6	113.3	28 03.0	114.3	27 34.0	115.3	27 04.6	116.3	26 34.8	117.3	40
30	30 41.1	114.7	30 11.5	115.7	29 41.5	116.7	29 11.0	117.7	28 40.1	118.7	30
20	32 49.3	116.1	32 18.5	117.2	31 47.4	118.2	31 15.8	119.2	30 43.6	120.2	20
10	34 55.7	117.7	34 23.8	118.8	33 51.5	119.8	33 18.7	120.8	32 45.4	121.8	10
3 00	37 00.4	119.3	36 27.2	120.4	35 53.6	121.4	35 19.5	122.4	34 44.8	123.4	3 00
2 50	39 03.0	121.1	38 28.4	122.2	37 53.5	123.2	37 18.1	124.2	36 42.1	125.2	2 50
40	41 03.3	122.9	40 27.4	124.0	39 51.0	125.0	39 14.1	126.1	38 36.7	127.1	40
30	43 00.9	124.9	42 23.6	126.0	41 45.7	127.0	41 07.2	128.1	40 28.4	129.1	30
20	44 55.8	127.1	44 16.8	128.2	43 37.4	129.2	42 57.4	130.2	42 16.8	131.2	20
10	46 47.2	129.4	46 06.5	130.5	45 25.4	131.5	44 43.8	132.5	44 01.6	133.5	10
2 00	48 34.9	131.9	47 52.5	133.0	47 09.6	134.0	46 26.3	135.0	45 42.3	136.0	2 00
1 50	50 18.1	134.6	49 33.9	135.7	48 49.3	136.7	48 04.1	137.7	47 18.5	138.7	1 50
40	51 56.6	137.6	51 10.5	138.6	50 24.0	139.6	49 37.1	140.5	48 49.5	141.5	40
30	53 29.3	140.7	52 41.3	141.7	51 53.0	142.7	51 04.2	143.6	50 15.0	144.5	30
20	54 55.9	144.1	54 06.1	145.1	53 15.8	146.0	52 25.2	146.9	51 34.0	147.7	20
10	56 15.3	147.8	55 23.5	148.7	54 31.4	149.6	53 38.9	150.4	52 46.2	151.2	10
1 00	57 26.9	151.7	56 33.2	152.5	55 39.3	153.3	54 45.2	154.1	53 59.5	154.8	1 00
0 50	58 29.5	155.9	57 34.0	156.7	56 38.5	157.4	55 42.7	158.1	54 46.6	158.7	0 50
40	59 22.3	160.4	58 25.2	161.0	57 28.3	161.6	56 31.2	162.1	55 33.7	162.7	40
30	60 04.4	165.1	59 06.1	165.6	58 07.9	166.0	57 09.1	166.4	56 11.1	166.8	30
20	60 35.1	169.9	59 35.8	170.3	58 36.7	170.6	57 37.4	170.9	56 38.0	171.2	20
10	60 53.7	174.9	59 54.0	175.1	58 54.1	175.3	57 54.3	175.4	56 54.5	175.6	10
0 00	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	2 00. 1	106. 6	1 39. 4	107. 6	1 18. 5	108. 5	0 57. 6	109. 4	0 36. 7	110. 4	5 30
20	4 15. 8	107. 5	3 32. 7	108. 4	3 11. 1	109. 3	3 49. 4	110. 3	2 27. 7	111. 2	20
10	6 30. 8	108. 3	6 08. 5	109. 3	5 46. 1	110. 2	5 23. 8	111. 2	5 01. 2	112. 1	10
5 00	8 45. 0	109. 3	8 21. 9	110. 2	7 58. 9	111. 1	7 35. 6	112. 1	7 12. 2	113. 0	5 00
4 50	10 58. 5	110. 2	10 34. 7	111. 2	10 10. 8	112. 1	9 46. 6	113. 0	9 22. 3	114. 0	4 50
40	13 11. 1	111. 2	12 46. 4	112. 2	12 21: 7	113. 1	12 56. 7	114. 0	11 31. 5	115. 0	40
30	15 22. 9	112. 2	14 57. 4	113. 2	14 31. 6	114. 1	14 05. 7	115. 1	13 39. 4	116. 0	30
20	17 33. 6	113. 3	17 07. 2	114. 3	16 40. 5	115. 2	16 13. 6	116. 2	15 46. 4	117. 1	20
10	19 43. 4	114. 5	19 15. 9	115. 4	18 48. 2	116. 3	18 20. 2	117. 3	17 52. 1	118. 2	10
4 00	21 51. 8	115. 7	21 23. 4	116. 6	20 54. 7	117. 6	20 25. 6	118. 5	19 56. 3	119. 4	4 00
3 50	23 58. 9	117. 0	23 29. 5	117. 9	22 59. 7	118. 9	22 29. 6	119. 8	21 59. 1	120. 7	3 50
40	26 04. 7	118. 3	25 34. 0	119. 2	25 03. 2	120. 2	24 31. 9	121. 1	24 00. 2	122. 0	40
30	28 08. 8	119. 7	27 37. 0	120. 6	27 04. 9	121. 6	26 32. 4	122. 5	25 59. 5	123. 4	30
20	30 11. 1	121. 2	29 38. 1	122. 1	29 04. 8	123. 1	28 31. 0	124. 0	27 56. 9	124. 9	20
10	32 11. 5	122. 8	31 37. 2	123. 7	31 02. 6	124. 7	30 27. 4	125. 6	29 52. 1	126. 5	10
3 00	34 09. 7	124. 4	33 34. 1	125. 3	32 58. 2	126. 3	32 21. 7	127. 3	31 44. 9	128. 2	3 00
2 50	36 05. 5	126. 2	35 28. 6	127. 1	34 51. 1	128. 1	34 13. 1	129. 1	33 35. 0	130. 0	2 50
40	37 58. 7	128. 1	37 20. 2	129. 0	36 41. 4	130. 0	36 02. 1	130. 9	35 22. 2	131. 8	40
30	39 48. 9	130. 1	39 08. 9	131. 0	38 28. 4	132. 0	37 47. 6	132. 9	37 06. 3	133. 8	30
20	41 35. 7	132. 2	40 54. 1	133. 2	40 12. 2	134. 1	39 29. 7	135. 0	38 46. 8	135. 9	20
10	43 18. 9	134. 5	42 35. 8	135. 5	41 52. 0	136. 4	41 07. 9	137. 3	40 23. 5	138. 2	10
2 00	44 57. 9	137. 0	44 13. 0	137. 9	43 27. 8	138. 8	42 42. 0	139. 7	41 55. 9	140. 6	2 00
1 50	46 32. 3	139. 6	45 45. 7	140. 5	44 58. 8	141. 4	44 11. 7	142. 2	43 23. 6	143. 1	1 50
40	48 01. 7	142. 4	47 13. 3	143. 3	46 24. 7	144. 1	45 35. 6	144. 9	44 46. 2	145. 8	40
30	49 25. 1	145. 4	48 35. 3	146. 2	47 44. 9	147. 0	46 54. 1	147. 8	46 03. 0	148. 6	30
20	50 42. 7	148. 6	49 50. 8	149. 4	48 58. 9	150. 1	48 06. 6	150. 9	47 13. 8	151. 6	20
10	51 53. 1	152. 0	50 59. 6	152. 7	50 06. 1	153. 4	49 12. 1	154. 1	48 18. 1	154. 7	10
1 00	52 55. 9	155. 5	52 00. 9	156. 2	51 05. 9	156. 8	50 10. 5	157. 4	49 14. 9	158. 0	1 00
0 50	53 50. 6	159. 2	52 54. 1	159. 8	51 57. 6	160. 4	51 00. 9	160. 9	50 04. 1	161. 4	0 50
40	54 36. 3	163. 2	53 38. 6	163. 7	52 41. 0	164. 1	51 43. 1	164. 6	50 45. 2	165. 0	40
30	55 12. 4	167. 2	54 13. 9	167. 6	53 15. 1	168. 0	52 16. 5	168. 3	51 17. 6	168. 6	30
20	55 38. 7	171. 4	54 39. 4	171. 7	53 40. 0	171. 9	52 40. 5	172. 2	51 41. 1	172. 4	20
10	55 54. 7	175. 7	54 54. 8	175. 8	53 55. 0	175. 9	52 55. 1	176. 1	51 55. 3	176. 2	10
0 00	56 0. 0	180. 0	55 0. 0	180. 0	54 0. 0	180. 0	53 0. 0	180. 0	52 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 15.8	111.3									5 30
20	2 27.7	112.1	2 05.9	113.1	1 44.1	114.0	1 22.2	114.9	1 00.4	115.9	20
10	4 38.6	113.0	4 15.9	114.0	3 53.2	114.9	3 30.4	115.8	3 07.6	116.8	10
5 00	6 48.7	113.9	6 25.1	114.9	6 01.4	115.8	5 37.6	116.7	5 13.7	117.6	5 00
4 50	8 57.8	114.9	8 33.3	115.8	8 08.6	116.7	7 43.7	117.6	7 18.7	118.5	4 50
40	11 06.0	115.9	10 40.4	116.8	10 14.7	117.7	9 48.9	118.6	9 22.8	119.5	40
30	13 13.0	116.9	12 46.5	117.8	12 19.7	118.7	11 52.7	119.6	11 25.7	120.5	30
20	15 19.0	118.0	14 51.3	118.9	14 23.4	119.8	13 55.4	120.7	13 27.1	121.6	20
10	17 23.5	119.2	16 54.7	120.1	16 25.7	121.0	15 56.5	121.9	15 27.1	122.8	10
4 00	19 26.7	120.4	18 56.8	121.3	18 26.6	122.2	17 56.1	123.1	17 25.5	124.0	4 00
3 50	21 28.2	121.7	20 57.2	122.6	20 25.7	123.5	19 54.2	124.4	19 22.3	125.3	3 50
40	23 28.2	123.0	22 55.9	123.9	22 23.3	124.8	21 50.3	125.7	21 17.1	126.6	40
30	25 26.2	124.4	24 52.7	125.3	24 18.7	126.2	23 44.5	127.1	23 10.1	128.0	30
20	27 22.3	125.9	26 47.4	126.8	26 12.1	127.7	25 36.6	128.6	25 00.7	129.5	20
10	29 16.2	127.5	28 39.8	128.4	28 03.2	129.3	27 26.3	130.2	26 49.1	131.1	10
3 00	31 07.5	129.1	30 29.8	130.0	29 51.8	130.9	29 13.4	131.8	28 34.7	132.7	3 00
2 50	32 56.2	130.9	32 17.2	131.8	31 37.6	132.7	30 57.7	133.5	30 17.6	134.4	2 50
40	34 42.0	132.7	34 01.4	133.6	33 20.4	134.5	32 39.0	135.3	31 57.4	136.2	40
30	36 24.4	134.7	35 42.3	135.6	34 59.8	136.5	34 17.1	137.3	33 33.8	138.2	30
20	38 03.5	136.8	37 19.8	137.7	36 35.7	138.5	35 51.3	139.3	35 06.6	140.2	20
10	39 38.6	139.1	38 53.5	139.9	38 07.6	140.7	37 21.6	141.5	36 35.4	142.3	10
2 00	41 09.3	141.4	40 22.5	142.2	39 35.2	143.0	38 47.7	143.8	37 59.8	144.6	2 00
1 50	42 35.4	143.9	41 46.9	144.7	40 58.2	145.5	40 09.0	146.2	39 19.7	147.0	1 50
40	43 56.4	146.5	43 06.3	147.3	42 15.9	148.0	41 25.3	148.7	40 34.4	149.5	40
30	45 11.7	149.3	44 20.0	150.0	43 28.1	150.7	42 36.0	151.4	41 43.8	152.2	30
20	46 21.0	152.3	45 27.8	152.9	44 34.5	153.6	43 40.9	154.2	42 47.2	154.9	20
10	47 23.6	155.3	46 29.0	155.9	45 34.2	156.5	44 39.4	157.1	43 44.4	157.7	10
1 00	48 19.2	158.5	47 23.3	159.1	46 27.3	159.6	45 31.1	160.1	44 34.8	160.6	1 00
0 50	49 07.2	161.9	48 10.2	162.4	47 23.1	162.8	46 15.7	163.3	45 18.4	163.7	0 50
40	49 47.2	165.4	48 49.2	165.8	47 50.9	166.1	46 52.7	166.5	45 54.5	166.8	40
30	50 18.7	168.9	49 19.8	169.2	48 20.9	169.5	47 21.9	169.8	46 22.7	170.0	30
20	50 41.6	172.6	49 42.1	172.8	48 42.5	173.0	47 43.0	173.2	46 43.4	173.3	20
10	50 55.4	176.3	49 55.5	176.4	48 55.6	176.5	47 55.7	176.6	46 55.9	176.7	10
0 00	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 20.5	89.1	0 41.0	88.1	1 01.5	87.2	1 22.0	86.2	6 00
5 50	2 21.0	90.8	2 41.5	89.9	3 01.9	89.0	3 22.3	88.0	3 42.8	87.1	5 50
40	4 41.9	91.7	5 02.4	90.8	5 22.9	89.8	5 43.2	88.9	6 03.5	87.9	40
30	7 02.8	92.6	7 23.3	91.6	7 43.8	90.7	8 04.2	89.7	8 24.4	88.8	30
20	9 23.5	93.5	9 44.2	92.5	10 04.8	91.5	10 25.1	90.6	10 45.3	89.6	20
10	11 44.1	94.3	12 04.9	93.4	12 25.6	92.4	12 46.1	91.5	13 06.3	90.5	10
5 00	14 04.6	95.2	14 25.6	94.3	14 46.4	93.3	15 06.9	92.3	15 27.2	91.3	5 00
4 50	16 24.8	96.1	16 46.1	95.2	17 07.0	94.2	17 27.8	93.2	17 48.2	92.2	4 50
40	18 44.8	97.1	19 06.3	96.1	19 27.6	95.1	19 48.4	94.1	20 08.9	93.1	40
30	21 04.6	98.1	21 26.4	97.1	21 47.8	96.1	22 08.9	95.0	22 29.6	94.0	30
20	23 23.9	99.1	23 46.1	98.1	24 07.9	97.0	24 29.1	96.0	24 50.1	95.0	20
10	25 42.9	100.1	26 05.5	99.1	26 27.6	98.0	26 49.2	97.0	27 10.5	95.9	10
4 00	28 01.5	101.2	28 24.5	100.1	28 47.0	99.1	29 09.0	98.0	29 30.5	96.9	4 00
3 50	30 19.4	102.3	30 42.9	101.2	31 05.8	100.1	31 28.4	99.0	31 50.2	98.0	3 50
40	32 36.9	103.5	33 00.9	102.4	33 24.5	101.3	33 47.3	100.1	34 09.6	99.0	40
30	34 53.6	104.7	35 18.4	103.6	35 42.4	102.5	36 05.8	101.3	36 28.6	100.2	30
20	37 09.5	106.0	37 34.9	104.9	37 59.7	103.7	38 23.7	102.6	38 47.1	101.4	20
10	39 24.5	107.4	39 50.8	106.2	40 16.2	105.1	40 41.0	103.9	41 05.0	102.7	10
3 00	41 38.5	108.9	42 05.5	107.7	42 31.9	106.5	42 57.4	105.2	43 22.1	104.0	3 00
2 50	43 51.2	110.5	44 19.2	109.3	44 46.5	108.0	45 13.0	106.7	45 38.5	105.4	2 50
40	46 02.5	112.2	46 31.6	110.9	47 00.0	109.6	47 27.3	108.3	47 53.8	107.0	40
30	48 12.2	114.0	48 42.5	112.7	49 11.9	111.4	49 40.5	110.0	50 08.1	108.7	30
20	50 19.9	116.0	50 51.6	114.7	51 22.3	113.3	51 52.0	111.9	52 20.8	110.5	20
10	52 25.3	118.2	52 58.4	116.8	53 30.8	115.4	54 01.9	114.0	54 31.9	112.5	10
2 00	54 28.1	120.6	55 02.9	119.2	55 36.8	117.8	56 09.4	116.3	56 41.0	114.8	2 00
1 50	56 27.6	123.3	57 04.4	121.9	57 40.0	120.4	58 14.5	118.8	58 47.9	117.3	1 50
40	58 23.5	126.3	59 02.1	124.8	59 39.9	123.3	60 16.2	121.7	60 51.4	120.1	40
30	60 14.6	129.5	60 55.6	128.1	61 35.5	126.5	62 14.0	124.9	62 51.6	123.2	30
20	62 00.6	133.2	62 43.7	131.7	63 26.1	130.1	64 07.1	128.5	64 47.1	126.8	20
10	63 39.6	137.3	64 25.6	135.8	65 10.5	134.3	65 54.2	132.6	66 37.0	130.9	10
1 00	65 11.1	141.9	65 59.5	140.5	66 47.4	139.0	67 33.9	137.4	68 19.6	135.6	1 00
0 50	66 33.1	147.1	67 24.2	145.7	68 15.1	144.3	69 04.6	142.8	69 53.5	141.1	0 50
40	67 43.9	152.7	68 37.6	151.5	69 31.3	150.3	70 23.7	148.9	71 15.7	147.4	40
30	68 41.6	159.0	69 38.0	158.0	70 34.0	156.9	71 29.3	155.8	72 24.5	154.5	30
20	69 24.6	165.7	70 22.8	165.0	71 21.0	164.2	72 18.7	163.3	73 16.3	162.4	20
10	69 51.0	172.7	70 50.6	172.4	71 50.1	172.0	72 49.5	171.5	73 48.9	171.0	10
0 00	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10					0 03.5	82.6	0 24.1	81.6	0 44.8	80.7	6 10
6 00	1 42.5	85.3	2 03.0	84.4	2 23.3	83.4	2 43.7	82.5	3 04.0	81.5	6 00
5 50	4 03.1	86.1	4 23.3	85.2	4 43.5	84.3	5 03.5	83.3	5 23.6	82.4	5 50
40	6 23.8	87.0	6 43.9	86.0	7 03.8	85.1	7 23.6	84.1	7 43.5	83.2	40
30	8 44.5	87.8	9 04.6	86.9	9 24.3	85.9	9 43.9	85.0	10 03.4	84.0	30
20	11 05.4	88.7	11 25.3	87.7	11 45.0	86.8	12 04.5	85.8	12 23.8	84.8	20
10	13 26.4	89.5	13 46.2	88.6	14 05.8	87.6	14 25.2	86.6	14 44.2	85.6	10
5 00	15 47.4	90.4	16 07.1	89.4	16 26.6	88.4	16 45.8	87.4	17 04.8	86.4	5 00
4 50	18 08.3	91.2	18 28.1	90.2	18 47.5	89.2	19 06.7	88.2	19 25.6	87.2	4 50
40	20 29.2	92.1	20 49.1	91.1	21 08.6	90.1	21 27.6	89.1	21 46.5	88.0	40
30	22 49.9	93.0	23 10.0	92.0	23 29.4	91.0	23 48.6	89.9	24 07.1	88.8	30
20	25 10.7	93.9	25 30.8	92.9	25 50.4	91.8	26 09.5	90.8	26 28.3	89.7	20
10	27 31.2	94.9	27 51.5	93.8	28 11.1	92.7	28 30.4	91.7	28 49.3	90.6	10
4 00	29 51.6	95.9	30 12.0	94.8	30 32.0	93.7	30 51.2	92.6	31 10.1	91.5	4 00
3 50	32 11.5	96.9	32 32.3	95.8	32 52.5	94.6	33 12.1	93.5	33 31.0	92.4	3 50
40	34 31.4	97.9	34 52.5	96.8	35 13.0	95.6	35 32.6	94.5	35 51.8	93.3	40
30	36 50.9	99.0	37 12.3	97.8	37 33.0	96.7	37 53.1	95.5	38 12.4	94.3	30
20	39 09.8	100.2	39 31.7	99.0	39 53.0	97.8	40 13.3	96.5	40 32.9	95.3	20
10	41 28.2	101.4	41 50.8	100.2	42 12.3	98.9	42 33.1	97.7	42 53.1	96.4	10
3 00	43 46.1	102.7	44 09.2	101.4	44 31.4	100.1	44 52.6	98.8	45 13.1	97.5	3 00
2 50	46 03.2	104.1	46 27.0	102.8	46 49.8	101.4	47 11.7	100.1	47 32.6	98.7	2 50
40	48 19.4	105.6	48 44.1	104.3	49 07.6	102.8	49 30.2	101.4	49 51.7	100.0	40
30	50 34.6	107.2	51 00.2	105.8	51 24.6	104.4	51 47.9	102.9	52 10.1	101.4	30
20	52 48.6	109.0	53 15.2	107.6	53 40.7	106.0	54 04.9	104.5	54 28.0	102.9	20
10	55 01.0	111.0	55 28.9	109.5	55 55.4	107.9	56 20.8	106.3	56 44.9	104.6	10
2 00	57 11.6	113.2	57 41.0	111.6	58 09.0	109.9	58 35.5	108.2	59 00.8	106.4	2 00
1 50	59 20.1	115.6	59 50.9	113.9	60 20.3	112.2	60 48.6	110.4	61 15.1	108.5	1 50
40	61 25.7	118.3	61 58.6	116.5	62 29.9	114.7	62 59.6	112.8	63 28.0	110.9	40
30	63 27.9	121.4	64 02.9	119.6	64 36.2	117.7	65 08.1	115.7	65 38.3	113.6	30
20	65 26.0	125.0	66 03.3	123.1	66 39.3	121.1	67 13.4	119.0	67 46.0	116.8	20
10	67 18.4	129.0	67 58.9	127.1	68 37.4	125.0	69 14.4	122.8	69 49.6	120.5	10
1 00	69 04.3	133.8	69 47.7	131.8	70 29.5	129.7	71 09.7	127.4	71 48.4	125.0	1 00
0 50	70 41.6	139.3	71 28.5	137.3	72 13.5	135.3	72 57.4	132.9	73 39.8	130.5	0 50
40	72 07.3	145.7	72 57.7	143.8	73 47.1	141.9	74 34.8	139.8	74 21.5	137.3	40
30	73 19.0	153.1	74 13.0	151.5	75 06.0	149.7	75 58.4	147.8	76 49.4	145.6	30
20	74 13.8	161.4	75 11.0	160.2	76 07.6	158.8	77 03.7	157.6	77 59.1	155.6	20
10	74 48.2	170.5	75 47.4	169.8	76 46.6	169.1	77 45.5	168.2	78 44.3	167.2	10
0 00	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——14

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 11.2	75.2	6 20
10	1 05.4	79.8	1 25.9	78.8	1 46.7	77.9	2 07.2	76.9	2 27.8	76.0	10
6 00	3 24.3	80.6	3 44.5	79.6	4 04.7	78.7	4 24.7	77.7	4 44.8	76.8	6 00
5 50	5 43.4	81.4	4 03.4	80.5	6 23.1	79.5	6 42.7	78.6	7 02.2	77.6	5 50
40	8 03.0	82.2	8 22.6	81.3	9 41.9	80.3	9 01.1	79.4	9 20.1	78.4	40
30	10 22.7	83.0	10 41.9	82.1	11 00.9	81.1	11 19.8	80.2	11 38.3	79.2	30
20	12 42.9	83.8	13 01.7	82.9	13 20.3	81.9	13 38.8	80.9	13 57.0	79.9	20
10	15 03.1	84.6	15 21.6	83.6	15 40.1	82.6	15 58.1	81.7	16 15.9	80.7	10
5 00	17 23.5	85.4	17 41.9	84.4	18 00.0	83.4	18 17.7	82.4	18 35.2	81.4	5 00
4 50	19 44.1	86.2	20 02.2	85.2	20 20.1	84.2	20 37.6	83.2	20 54.7	82.2	4 50
40	22 04.8	87.0	22 22.8	86.0	22 40.4	85.0	22 57.6	83.9	23 14.4	82.9	40
30	24 25.7	87.8	24 43.4	86.8	25 00.7	85.7	25 17.8	84.7	25 34.4	83.6	30
20	26 46.5	88.7	27 04.3	87.6	27 21.5	86.5	27 38.3	85.4	27 54.5	84.4	20
10	29 07.4	89.5	29 25.0	88.4	29 42.3	87.3	29 58.2	86.2	30 14.8	85.1	10
4 00	31 28.4	90.3	31 46.1	89.2	32 03.2	88.1	32 19.5	87.0	32 35.4	85.8	4 00
3 50	33 49.3	91.2	34 06.9	90.1	34 24.0	88.9	34 40.3	87.7	34 56.1	86.6	3 50
40	36 10.2	92.1	36 28.0	90.9	36 45.0	89.7	37 01.2	88.5	37 16.8	87.3	40
30	38 30.9	93.0	38 48.8	91.8	39 05.8	90.6	39 22.1	89.4	39 37.7	88.1	30
20	40 51.7	94.0	41 09.8	92.8	41 26.8	91.5	41 43.1	90.2	41 58.6	88.9	20
10	43 12.2	95.0	43 30.4	93.7	43 47.7	92.4	44 04.0	91.1	44 19.6	89.7	10
3 00	45 32.5	96.1	45 51.0	94.8	46 08.5	93.4	46 25.0	92.0	46 40.5	90.6	3 00
2 50	47 52.5	97.3	48 11.3	95.9	48 29.1	94.4	48 45.8	93.0	49 01.4	91.5	2 50
40	50 12.1	98.5	50 31.4	97.0	50 49.5	95.5	51 06.5	94.0	51 22.2	92.5	40
30	52 31.1	99.9	52 51.0	98.3	53 09.7	96.7	53 26.9	95.1	53 43.0	93.5	30
20	54 49.8	101.3	55 10.4	99.7	55 29.5	98.0	55 47.3	96.3	56 03.6	94.6	20
10	57 07.5	102.9	57 28.9	101.2	57 48.7	99.4	58 07.1	97.6	58 24.0	95.8	10
2 00	59 24.5	104.6	59 46.9	102.8	60 07.6	100.9	60 26.7	99.0	60 44.0	97.1	2 00
1 50	61 40.3	106.5	62 03.7	104.7	62 25.4	102.6	62 45.4	100.6	63 03.6	98.5	1 50
40	63 54.6	108.8	64 19.6	106.7	64 42.6	104.6	65 03.6	102.4	65 22.8	100.2	40
30	66 06.9	111.5	66 33.5	109.2	66 58.2	106.9	67 20.8	104.5	67 41.2	102.1	30
20	68 16.8	114.5	68 45.6	112.1	69 12.2	109.6	69 36.3	107.0	69 58.4	104.3	20
10	70 23.2	118.1	70 54.4	115.5	71 23.5	112.8	71 50.0	109.9	72 14.2	107.0	10
1 00	72 25.0	122.5	72 59.6	119.7	73 31.7	116.8	74 01.0	113.6	74 27.7	110.4	1 00
0 50	74 20.3	127.8	74 58.5	124.9	75 34.3	121.8	76 07.8	118.3	72 37.8	114.7	0 50
40	76 06.3	134.6	76 49.4	131.5	77 30.2	128.3	78 08.2	124.6	78 43.1	120.6	40
30	77 39.4	143.0	78 28.0	140.1	79 14.0	136.9	79 58.0	133.0	80 39.0	128.8	30
20	78 54.0	153.5	79 47.7	151.1	80 40.2	148.3	81 31.1	144.8	82 19.7	140.7	20
10	79 42.8	166.1	80 41.0	164.7	81 38.8	162.9	82 36.1	160.7	83 32.5	157.9	10
0 00	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 32.4	74.2	0 53.4	73.3	1 14.6	72.4	1 35.6	71.4	1 56.6	70.5	6 20
10	2 48.3	75.1	3 08.7	74.1	3 29.1	73.2	3 49.5	72.2	4 09.8	71.3	10
6 00	5 04.7	75.9	5 24.6	74.9	5 44.3	74.0	6 04.0	73.0	6 23.6	72.1	6 00
5 50	7 21.7	76.7	7 40.9	75.7	8 00.0	74.7	8 19.1	73.8	8 37.9	72.8	5 50
40	9 39.0	77.4	9 57.7	76.6	10 16.2	75.5	10 34.7	74.5	10 52.9	73.6	40
30	11 56.8	78.2	12 14.9	77.2	12 32.9	76.3	12 50.8	75.3	13 08.3	74.3	30
20	14 14.9	78.9	14 32.7	78.0	14 50.1	77.0	15 07.3	76.0	15 24.3	75.0	20
10	16 33.4	79.7	16 50.7	78.7	17 07.6	77.7	17 24.2	76.7	17 40.6	75.7	10
5 00	18 52.2	80.4	19 09.1	79.4	19 25.5	78.4	19 41.7	77.4	19 57.4	76.3	5 00
4 50	21 11.4	81.1	21 27.7	80 1	21 43.8	79.1	21 59.4	78.0	22 14.5	77.0	4 50
40	23 30.8	81.8	23 46.8	80.8	24 02.3	79.7	24 17.4	78.7	24 32.0	77.6	40
30	25 50.5	82.5	26 06.0	81.5	26 21.0	80.4	26 35.7	79.3	26 49.7	78.2	30
20	28 10.3	83.2	28 25.5	82.2	28 40.2	81.1	28 54.4	80.0	29 08.0	78.8	20
10	30 30.4	83.9	30 45.2	82.8	30 59.4	81.7	31 13.2	80.6	31 26.3	79.4	10
4 00	32 50.6	84.7	33 05.3	83.5	33 19.2	82.4	33 32.5	81.2	33 45.1	80.0	4 00
3 50	35 11.1	85.4	35 25.3	84.2	35 38.9	83.0	35 51.9	81.8	36 04.0	80.6	3 50
40	37 31.6	86.1	37 45.8	84.9	37 59.0	83.6	38 11.5	82.4	38 23.3	81.2	40
30	39 52.2	86.8	40 06.1	85.6	40 19.1	84.3	40 31.4	83.0	40 42.6	81.7	30
20	42 13.1	87.6	42 26.8	86.3	42 39.4	85.0	42 51.3	83.6	43 02.2	82.3	20
10	44 34.0	88.4	44 47.4	87.0	45 00.0	85.6	45 11.5	84.2	45 22.0	82.8	10
3 00	46 54.8	89.2	47 08.3	87.7	47 20.6	86.3	47 31.8	84.9	47 41.9	83.4	3 00
2 50	49 15.9	90.0	49 29.1	88.5	49 41.2	87 0	49 52.2	85.5	50 01.9	84.0	2 50
40	51 36.8	90.9	51 50.1	89.3	52 02.1	87.7	52 12.9	86.1	52 22.3	84.5	40
30	53 57.7	91.8	54 11.0	90.2	54 22.9	88.5	54 33.6	86.8	54 42.5	85.1	30
20	56 18.5	92.8	56 32.0	91.1	56 43.8	89.3	56 54.4	87.5	57 03.1	85.7	20
10	58 39.2	93.9	58 52.9	92.0	59 05.8	90.1	59 15.2	88.2	59 23.7	86.3	10
2 00	60 59.7	95.1	61 13.7	93.1	61 25.8	91.0	61 36.1	88.9	61 44.3	86.9	2 00
1 50	63 20.0	96.3	63 34.2	94.2	63 46.7	92.0	63 57.0	89.8	64 05.0	87.5	1 50
40	65 39.8	97.8	65 54.9	95.5	66 07.6	93.1	66 18.0	90.6	67 26.9	88.2	40
30	67 59.2	99.5	68 15.0	96.9	68 28.1	94.3	68 39.0	91.6	68 47.0	88.9	30
20	70 17.7	101.5	70 34.8	98.6	70 48.7	95.7	70 59.7	92.7	71 08.0	89.6	20
10	72 35.2	103.9	72 53.5	100.7	73 08.5	97.4	73 20.5	94.0	73 28.7	90.5	10
1 00	74 51.1	106.9	75 11.7	103.2	75 28.1	99.4	75 40.9	95.5	75 49.8	91.5	1 00
0 50	77 04.7	110.8	77 27.5	106.5	77 46.5	102.1	78 01.8	97.5	78 10.5	92.8	0 50
40	79 14.1	116.1	79 41.1	111.1	80 03.4	105.9	80 20.4	100.2	80 31.3	94.4	40
30	81 17.0	123.8	81 49.5	118.1	82 17.0	111.6	82 38.0	104.5	82 51.5	96.8	30
20	83 05.5	135.6	83 47.3	129.3	84 23.4	121.5	84 52.0	112.1	85 10.9	101.1	20
10	84 27.7	154.1	85 20.9	148.9	86 10.6	141.3	86 54.2	129.8	87 26.4	112.6	10
0 00	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

66° 26.0′

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′		° ′	°	h. m.
6 30	0 05.8	68.7	0 27.7	67.8	0 49.5	66.8	1 11.2	65.9	1 33.1	65.0	6 30
20	2 17.6	69.5	2 38.6	68.6	2 59.5	67.7	3 20.4	66.7	3 41.2	65.8	20
10	4 29.9	70.3	4 50.1	69.4	5 10.2	68.5	5 30.2	67.5	5 50.1	66.6	10
6 00	6 43.1	71.1	7 02.4	70.2	7 21.6	69.2	7 40.8	68.3	7 59.7	67.3	6 00
5 50	8 56.7	71.9	9 15.2	70.9	9 33.7	69.9	9 51.9	69.0	10 10.1	68.0	5 50
40	11 11.0	72.6	11 28.8	71.6	11 46.4	70.6	12 03.9	69.7	12 21.1	68.7	40
30	13 25.6	73.3	13 42.8	72.3	13 59.7	71.3	14 16.2	70.4	14 32.7	69.4	30
20	15 41.0	74.0	15 57.4	73.0	16 13.5	72.0	16 29.4	71.0	16 44.9	70.0	20
10	17 56.6	74.7	18 12.3	73.6	18 27.8	72.6	18 42.8	71.6	18 57.7	70.6	10
5 00	20 12.8	75.3	20 27.9	74.3	20 42.5	73.2	20 56.8	72.2	21 10.7	71.1	5 00
4 50	22 29.3	75.9	22 43.7	74.9	22 57.7	73.8	23 11.2	72.8	23 24.3	71.7	4 50
40	24 46.3	76.5	25 00.0	75.5	25 13.2	74.4	25 26.0	73.3	25 38.4	72.2	40
30	27 03.4	77.1	27 16.6	76.0	27 29.2	74.9	27 41.2	73.8	27 52.8	72.7	30
20	29 21.1	77.7	29 33.5	76.6	29 45.4	75.5	29 56.8	74.3	30 07.5	73.2	20
10	31 38.8	78.3	31 50.7	77.1	32 02.0	76.0	32 12.7	74.8	32 22.7	73.7	10
4 00	33 57.1	78.8	34 08.4	77.7	34 18.9	76.5	34 28.8	75.3	34 38.0	74.1	4 00
3 50	36 15.5	79.4	36 26.2	78.2	36 36.2	76.9	36 45.2	75.7	36 53.7	74.4	3 50
40	38 34.1	79.9	38 44.3	78.7	38 53.5	77.4	39 02.0	76.1	39 09.6	74.8	40
30	40 53.0	80.4	41 02.6	79.1	41 11.2	77.8	41 18.9	76.5	41 25.7	75.2	30
20	43 12.2	80.9	43 21.1	79.6	43 29.1	78.2	43 36.1	76.9	43 42.1	75.5	20
10	45 31.4	81.4	45 40.0	80.0	45 47.2	78.6	45 53.5	77.2	45 58.6	75.8	10
3 00	47 50.9	81.9	47 58.7	80.5	48 05.4	79.0	48 10.9	77.5	48 15.3	76.0	3 00
2 50	50 10.5	82.4	50 47.7	80.9	50 23.8	79.3	50 28.6	77.8	50 32.1	76.2	2 50
40	52 30.3	82.9	52 37.1	81.3	52 42.4	79.6	52 46.5	78.0	52 49.0	76.3	40
30	54 50.2	83.4	54 56.5	81.6	55 01.1	79.9	55 04.4	78.2	55 06.0	76.4	30
20	57 10.4	83.9	57 16.0	82.0	57 20.0	80.2	57 22.3	78.3	57 23.0	76.4	20
10	59 30.5	84.4	59 35.5	82.4	59 38.9	80.5	59 40.4	78.4	59 40.7	76.3	10
2 00	61 51.0	84.8	61 55.4	82.6	61 57.8	80.5	61 58.4	78.4	61 57.0	76.3	2 00
1 50	64 11.2	85.3	64 15.2	82.9	64 16.9	80.6	64 16.5	78.3	64 13.9	76.0	1 50
40	66 31.8	85.7	66 35.2	83.2	66 36.0	80.6	66 34.5	78.1	66 30.5	75.6	40
30	68 52.4	86.1	68 55.0	83.3	68 55.2	80.6	68 52.2	77.8	68 47.0	75.0	30
20	71 13.0	86.6	71 15.2	83.5	71 14.0	80.4	71 10.1	77.2	71 02.9	74.2	20
10	73 33.7	87.0	73 35.0	83.5	73 33.2	80.0	73 27.0	76.4	73 18.2	73.0	10
1 00	75 54.6	87.4	75 55.2	83.3	75 51.4	79.2	75 43.9	75.2	75 32.3	71.3	1 00
0 50	78 15.5	87.9	78 15.0	82.9	78 10.0	78.1	77 59.5	73.3	77 44.5	68.8	0 50
40	80 36.4	88.3	80 34.8	82.2	80 27.3	76.2	80 13.5	70.3	79 54.4	64.9	40
30	82 57.0	88.7	82 54.0	80.6	82 43.0	72.8	82 24.0	65.4	81 59.0	58.7	30
20	85 18.1	89.2	85 12.7	77.1	84 55.3	65.9	84 27.9	56.3	83 52.7	48.3	20
10	87 39.1	89.6	87 27.2	66.4	86 55.6	49.0	86 12.2	37.3	85 22.6	29.6	10
0 00	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	86 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 21.0	90.8	2 00.4	91.8	1 39.8	92.7	1 19.1	93.7	0 58.6	94.6	5 50
40	4 41.9	91.7	4 21.2	92.7	4 00.5	93.6	3 39.8	94.5	3 18.9	95.5	40
30	7 02.8	92.6	6 41.9	93.5	6 21.1	94.5	6 00.2	95.4	5 39.1	96.4	30
20	9 23.5	93.5	9 02.6	94.4	8 41.6	95.4	8 20.3	96.3	7 59.1	97.2	20
10	11 44.1	94.3	11 23.0	95.3	11 01.8	96.3	10 40.4	97.2	10 18.8	98.1	10
5 00	14 04.6	95.2	13 43.3	96.2	13 21.8	97.2	13 00.1	98.1	12 38.1	99.1	5 00
4 50	16 24.8	96.1	16 03.3	97.1	15 41.4	98.1	15 19.4	99.0	14 57.2	100.0	4 50
40	18 44.8	97.1	18 23.0	98.1	18 00.9	99.1	17 38.4	100.0	17 15.7	101.0	40
30	21 04.6	98.1	20 42.4	99.1	20 19.8	100.1	19 57.0	101.0	19 33.8	102.0	30
20	23 23.9	99.1	23 01.3	100.1	22 38.4	101.1	22 15.0	102.1	21 51.4	103.1	20
10	25 42.9	100.1	25 19.9	101.1	24 56.5	102.2	24 32.7	103.2	24 08.4	104.2	10
4 00	28 01.5	101.2	27 38.0	102.2	27 14.0	103.3	26 49.6	104.3	26 24.7	105.3	4 00
3 50	30 19.4	102.3	29 55.4	103.3	29 30.8	104.4	29 05.8	105.5	28 40.2	106.5	3 50
40	32 36.9	103.5	32 12.2	104.5	31 47.0	105.6	31 21.2	106.7	30 55.0	107.7	40
30	34 53.6	104.7	34 28.3	105.8	34 02.3	106.9	33 35.8	108.0	33 08.8	109.1	30
20	37 09.5	106.0	36 43.4	107.2	36 16.7	108.3	35 49.3	109.4	35 21.5	110.5	20
10	39 24.5	107.4	38 57.6	108.6	38 30.0	109.7	38 01.8	110.8	37 32.9	111.9	10
3 00	41 38.5	108.9	41 10.6	110.1	40 41.2	111.2	40 12.8	112.4	39 42.9	113.5	3 00
2 50	43 51.2	110.5	43 22.4	111.7	42 52.7	112.9	42 22.5	114.1	41 51.3	115.2	2 50
40	46 02.5	112.2	45 32.5	113.4	45 01.8	114.6	44 30.2	115.8	43 58.0	117.0	40
30	48 12.2	114.0	47 40.9	115.3	47 08.8	116.5	46 36.0	117.8	46 02.5	119.0	30
20	50 19.9	116.0	49 47.3	117.3	49 13.8	118.6	48 39.5	119.9	48 04.4	121.1	20
10	52 25.3	118.2	51 51.1	119.6	51 16.2	120.9	50 40.4	122.2	50 03.6	123.4	10
2 00	54 28.1	120.6	53 52.3	122.0	53 15.7	123.4	52 38.0	124.6	51 59.6	125.9	2 00
1 50	56 27.6	123.3	55 50.1	124.7	55 11.6	126.1	54 32.1	127.3	53 51.9	128.6	1 50
40	58 23.5	126.3	57 43.8	127.7	57 03.4	129.1	56 21.8	130.3	55 39.6	131.6	40
30	60 14.6	129.5	59 32.9	131.0	58 50.2	132.4	58 06.6	133.7	57 22.2	134.9	30
20	62 00.6	133.2	61 16.3	134.6	60 31.4	136.0	59 45.4	137.3	58 58.9	138.5	20
10	63 39.6	137.3	62 53.1	138.7	62 05.6	140.0	61 17.4	141.3	60 28.6	142.5	10
1 00	65 11.1	141.9	64 21.8	143.3	63 32.0	144.5	62 41.2	145.7	61 50.1	146.9	1 00
0 50	66 33.1	147.1	65 41.1	148.3	64 48.7	149.4	63 55.8	150.5	63 02.5	151.6	0 50
40	67 43.9	152.7	66 49.4	153.8	65 54.7	154.8	64 59.4	155.8	64 03.9	156.7	40
30	68 41.6	159.0	67 45.0	159.8	66 48.0	160.7	65 50.9	161.4	64 53.6	162.1	30
20	69 24.6	165.7	68 26.1	166.3	67 27.6	166.9	66 28.8	167.4	65 30.1	167.9	20
10	69 51.0	172.7	68 51.4	173.1	67 51.8	173.4	66 52.2	173.6	65 52.5	173.9	10
0 00	70 0.0	180.0	69 0.0	180.0	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 37.9	95.6	0 17.2	96.5							5 50
40	2 58.1	96.4	2 37.2	97.4	2 16.2	98.3	1 55.2	99.2	1 34.2	100.2	40
30	5 17.9	97.3	4 56.8	98.2	4 35.5	99.2	4 14.1	100.1	3 52.6	101.1	30
20	7 37.7	98.2	7 16.1	99.1	6 54.5	100.1	6 32.7	101.0	6 10.9	101.9	20
10	9 57.1	99.1	9 35.1	100.0	9 13.1	101.0	8 50.9	101.9	8 28.5	102.9	10
5 00	12 16.1	100.0	11 53.7	100.9	11 31.2	101.9	11 08.5	102.8	10 45.7	103.8	5 00
4 50	14 34.6	101.0	14 11.9	101.9	13 48.8	102.9	13 25.6	103.8	13 02.2	104.8	4 50
40	16 52.8	102.0	16 29.5	102.9	16 06.0	103.9	15 42.2	104.9	15 18.2	105.8	40
30	19 10.4	103.0	18 46.7	104.0	18 22.5	104.9	17 58.2	105.9	17 33.4	106.9	30
20	21 27.4	104.0	21 03.1	105.0	20 38.5	106.0	20 13.3	107.0	19 48.0	108.0	20
10	23 43.8	105.1	23 18.9	106.1	22 53.4	107.1	22 27.7	108.1	22 01.7	109.1	10
4 00	25 59.5	106.3	25 33.8	107.3	25 07.8	108.3	24 41.2	109.3	24 14.4	110.3	4 00
3 50	28 14.3	107.5	27 48.0	108.5	27 21.1	109.5	26 53.8	110.5	26 26.1	111.5	3 50
40	30 28.4	108.8	30 01.1	109.8	29 33.5	110.8	29 05.2	111.8	28 36.6	112.8	40
30	32 41.2	110.1	32 13.2	111.2	31 44.5	112.2	31 15.4	113.2	30 45.8	114.2	30
20	34 53.0	111.5	34 24.0	112.6	33 54.5	113.6	33 24.2	114.7	32 53.7	115.7	20
10	37 03.5	113.0	36 43.5	114.1	36 02.7	115.1	35 31.5	116.2	34 59.7	117.3	10
3 00	39 12.4	114.6	38 41.2	115.7	38 09.5	116.8	37 37.1	117.9	37 04.2	118.9	3 00
2 50	41 19.7	116.3	40 47.4	117.4	40 14.3	118.5	39 40.6	119.6	39 06.4	120.7	2 50
40	43 25.0	118.2	42 51.3	119.3	42 17.0	120.4	41 42.0	121.5	41 06.5	122.6	40
30	45 28.1	120.2	44 53.1	121.3	44 17.3	122.4	43 40.8	123.5	43 03.9	124.6	30
20	47 28.6	122.3	46 52.1	123.5	46 14.9	124.6	45 36.9	125.7	44 58.4	126.8	20
10	49 26.2	124.6	48 48.1	125.8	48 09.1	127.0	47 29.6	128.1	46 49.5	129.2	10
2 00	51 20.5	127.1	50 40.7	128.3	50 00.1	129.5	49 18.7	130.6	48 36.9	131.7	2 00
1 50	53 10.9	129.9	52 29.2	131.1	51 46.6	132.2	51 03.6	133.3	50 19.8	134.4	1 50
40	54 56.7	132.9	54 13.0	134.0	53 28.7	135.2	52 43.6	136.3	51 58.0	137.3	40
30	56 37.4	136.1	55 51.5	137.3	55 05.1	138.4	54 18.1	139.5	53 30.6	140.5	30
20	58 11.8	139.7	57 23.9	140.9	56 35.6	141.9	55 46.4	143.0	54 56.9	144.0	20
10	59 39.0	143.6	58 49.2	144.7	57 58.6	145.7	57 07.6	146.8	56 16.1	147.7	10
1 00	60 58.5	147.9	60 06.4	148.9	59 13.9	149.8	58 20.8	150.8	57 27.5	151.6	1 00
0 50	62 08.6	152.5	61 14.4	153.4	60 19.9	154.3	59 25.0	155.1	58 29.9	155.9	0 50
40	63 08.2	157.5	62 12.1	158.3	61 16.0	159.0	60 19.2	159.7	59 22.6	160.3	40
30	63 56.0	162.8	62 58.5	163.4	62 00.6	164.0	61 02.6	164.5	60 04.5	165.0	30
20	64 31.2	168.4	63 32.4	168.8	62 33.4	169.2	61 34.3	169.6	60 35.2	169.9	20
10	64 52.8	174.1	63 53.0	174.4	62 53.3	174.6	61 53.5	174.8	60 53.7	174.9	10
0 00	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 13. 1	101. 1	0 52. 1	102. 0	0 30. 9	103. 0	0 09. 8	103. 9			5 40
30	3 31. 2	102. 0	3 09. 6	102. 9	2 48. 1	103. 8	2 26. 4	104. 8	2 04. 7	105. 7	30
20	5 48. 9	102. 9	5 26. 8	103. 8	5 04. 6	104. 7	4 42. 4	105. 7	4 20. 1	106. 6	20
10	8 06. 0	103. 8	7 43. 3	104. 7	7 20. 7	105. 7	6 57. 9	106. 6	6 34. 8	107. 5	10
5 00	10 22. 6	104. 7	9 59. 4	105. 7	9 36. 1	106. 6	9 12. 5	107. 6	8 48. 9	108. 5	5 00
4 50	12 38. 6	105. 7	12 14. 7	106. 7	11 50. 7	107. 6	11 26. 6	108. 6	11 02. 1	109. 5	4 50
40	14 54. 0	106. 7	14 29. 5	107. 7	14 04. 7	108. 6	13 39. 8	109. 6	13 14. 6	110. 5	40
30	17 08. 6	107. 8	16 43. 4	108. 8	16 17. 9	109. 7	15 52. 2	110. 7	15 26. 2	111. 6	30
20	19 22. 3	108. 9	18 56. 4	109. 9	18 30. 1	110. 8	18 03. 6	111. 7	17 36. 8	112. 7	20
10	21 35. 2	110. 0	21 08. 4	111. 0	20 41. 4	112. 0	20 14. 0	112. 9	19 46. 2	113. 9	10
4 00	23 47. 2	111. 2	23 19. 6	112. 2	22 51. 6	113. 2	22 23. 2	114. 1	21 54. 6	115. 1	4 00
3 50	25 57. 9	112. 5	25 29. 4	113. 5	25 00. 5	114. 4	24 31. 2	115. 4	24 01. 6	116. 4	3 50
40	28 07. 6	113. 8	27 38. 1	114. 8	27 08. 1	115. 8	26 37. 8	116. 8	26 07. 1	117. 7	40
30	30 15. 7	115. 2	29 45. 2	116. 2	29 14. 2	117. 2	28 42. 9	118. 2	28 11. 1	119. 1	30
20	32 22. 5	116. 7	31 50. 9	117. 7	31 18. 8	118. 7	30 46. 2	119. 7	30 13. 3	120. 7	20
10	34 27. 5	118. 3	33 54. 8	119. 3	33 21. 4	120. 3	32 47. 8	121. 3	32 13. 6	122. 3	10
3 00	36 30. 6	120. 0	35 56. 7	121. 0	35 22. 1	122. 0	34 47. 1	123. 0	34 11. 6	124. 0	3 00
2 50	38 31. 7	121. 7	37 56. 4	122. 8	37 20. 5	123. 8	36 44. 1	124. 8	36 07. 2	125. 7	2 50
40	40 30. 4	123. 6	39 53. 6	124. 7	39 16. 3	125. 7	38 38. 5	126. 7	38 00. 3	127. 7	40
30	42 26. 2	125. 7	41 48. 0	126. 7	41 09. 5	127. 7	40 30. 1	128. 7	39 50. 2	129. 7	30
20	44 19. 2	127. 9	43 39. 5	128. 9	42 59. 2	129. 9	42 18. 3	130. 9	41 37. 0	131. 9	20
10	46 08. 6	130. 2	45 27. 3	131. 3	44 45. 3	132. 3	44 03. 0	133. 2	43 20. 0	134. 2	10
2 00	47 54. 3	132. 7	47 11. 3	133. 8	46 27. 7	134. 8	45 43. 5	135. 7	44 58. 9	136. 7	2 00
1 50	49 35. 6	135. 5	48 50. 8	136. 5	48 05. 3	137. 5	47 19. 6	138. 4	46 33. 1	139. 4	1 50
40	51 11. 9	138. 4	50 25. 3	139. 4	49 38. 1	140. 4	48 50. 4	141. 3	48 02. 4	142. 2	40
30	52 42. 6	141. 5	51 54. 0	142. 5	51 05. 1	143. 5	50 15. 8	144. 3	49 26. 0	145. 2	30
20	54 07. 0	144. 9	53 16. 7	145. 8	52 25. 9	146. 7	51 34. 5	147. 5	50 43. 1	148. 4	20
10	55 24. 4	148. 6	54 32. 0	149. 4	53 39. 5	150. 2	52 46. 7	151. 0	51 53. 5	151. 8	10
1 00	56 33. 8	152. 4	55 39. 9	153. 2	54 45. 6	154. 0	53 50. 9	154. 7	52 56. 2	155. 4	1 00
0 50	57 34. 4	156. 6	56 38. 9	157. 3	55 42. 9	157. 9	54 47. 0	158. 6	53 50. 7	159. 2	0 50
40	58 25. 5	160. 9	57 28. 6	161. 5	56 31. 3	162. 1	55 33. 8	162. 6	54 36. 4	163. 1	40
30	59 06. 3	165. 5	58 08. 0	166. 0	57 09. 5	166. 4	56 11. 1	166. 8	55 12. 5	167. 2	30
20	59 36. 0	170. 2	58 36. 7	170. 6	57 37. 4	170. 9	56 38. 1	171. 1	55 38. 8	171. 4	20
10	59 54. 0	175. 1	58 54. 1	175. 2	57 54. 3	175. 4	56 54. 5	175. 5	55 54. 7	175. 7	10
0 00	60 0. 0	180. 0	59 0. 0	180. 0	58 0. 0	180. 0	57 0. 0	180. 0	56 0. 0	180. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 42.9	106.6	1 21.1	107.6	0 59.4	108.5	0 37.6	109.4	0 15.8	110.4	5 30
20	3 27.7	107.6	3 35.3	108.5	3 12.8	109.4	2 50.2	110.3	2 27.7	111.3	20
10	16 11.8	108.5	15 48.6	109.4	15 25.3	100.3	15 02.0	111.2	4 38.6	112.2	10
5 00	8 25.1	109.4	8 01.2	110.3	7 37.1	111.3	7 13.0	112.2	6 48.7	113.1	5 00
4 50	10 37.6	110.4	10 12.9	111.3	9 48.1	112.3	9 23.1	113.2	8 57.8	114.1	4 50
40	12 49.3	111.4	12 23.8	112.4	11 58.0	113.3	11 32.1	114.2	11 06.0	115.1	40
30	15 00.1	112.5	14 33.6	113.4	14 06.9	114.4	13 40.1	115.3	13 13.0	116.2	30
20	17 09.7	113.6	16 42.4	114.5	16 14.8	115.5	15 47.0	116.4	15 19.0	117.3	20
10	19 18.3	114.8	18 50.0	115.7	18 21.4	116.7	17 52.6	117.6	17 23.5	118.5	10
4 00	21 25.6	116.0	20 56.4	117.0	20 26.7	117.9	19 56.9	118.8	19 26.7	119.7	4 00
3 50	23 31.6	117.3	23 01.2	118.2	22 30.6	119.2	21 59.6	120.1	21 28.2	121.0	3 50
40	25 36.0	118.7	25 04.7	119.6	24 32.8	120.6	24 00.7	121.5	23 28.2	122.4	40
30	27 38.8	120.1	27 06.3	121.0	26 33.3	122.0	26 00.0	122.9	25 26.2	123.8	30
20	29 39.8	121.6	29 06.1	122.6	28 31.8	123.5	27 57.3	124.4	27 22.3	125.3	20
10	31 38.9	123.2	31 03.8	124.2	30 28.3	125.1	29 52.4	126.0	29 16.2	126.9	10
3 00	33 35.6	124.9	32 59.3	125.9	32 22.4	126.8	31 45.2	127.8	31 07.5	128.7	3 00
2 50	35 30.0	126.7	34 52.1	127.7	34 13.9	128.6	33 35.3	129.5	32 56.2	130.4	2 50
40	37 21.5	128.6	36 42.3	129.6	36 02.6	130.5	35 22.5	131.4	34 42.0	132.3	40
30	39 09.9	130.6	38 29.3	131.6	37 48.1	132.5	37 06.6	133.4	36 24.4	134.3	30
20	40 55.2	132.8	40 13.0	133.8	39 30.1	134.7	38 47.1	135.6	38 03.5	136.5	20
10	42 36.6	135.1	41 52.8	136.1	41 08.4	137.0	40 23.8	137.9	39 38.6	138.7	10
2 00	44 13.8	137.6	43 28.4	138.5	42 48.2	139.4	41 56.1	140.3	41 09.3	141.1	2 00
1 50	45 46.5	140.3	44 59.1	141.1	44 11.7	142.0	43 23.8	142.9	42 35.3	143.6	1 50
40	47 13.9	143.0	46 25.1	143.9	45 35.9	144.7	44 46.3	145.5	43 56.4	146.3	40
30	48 35.8	146.0	47 45.2	146.8	46 54.4	147.6	46 03.3	148.4	45 11.7	149.1	30
20	49 51.2	149.2	48 59.3	149.9	48 06.7	150.7	47 13.9	151.4	46 21.0	152.1	20
10	51 00.0	152.5	50 06.2	153.2	49 12.2	153.9	48 18.1	154.5	47 23.6	155.2	10
1 00	52 01.1	156.0	51 06.1	156.7	50 10.6	157.3	49 15.0	157.8	48 19.2	158.4	1 00
0 50	52 54.3	159.7	51 57.8	160.3	51 01.1	160.8	50 04.2	161.3	49 07.2	161.8	0 50
40	53 38.7	163.6	52 41.0	164.0	51 43.1	164.5	50 45.3	164.9	49 47.2	165.3	40
30	54 14.0	167.6	53 15.2	167.9	52 16.5	168.3	51 17.6	168.6	50 18.7	168.9	30
20	54 39.3	171.6	53 40.0	171.9	52 40.6	172.1	51 41.1	172.3	50 41.6	172.5	20
10	54 54.8	175.8	53 55.0	175.9	52 55.1	176.0	51 55.2	176.1	50 55.4	176.2	10
0 00	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

3° 57.7

6° 11.8

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	2 05.0	112.2	1 42.4	113.1	1 19.6	114.0	0 56.9	115.0	0 34.2	115.9	5 20
10	4 15.1	113.1	3 51.6	114.0	3 27.9	114.9	3 04.2	115.9	2 40.6	116.8	10
5 00	6 24.3	114.0	5 59.9	114.9	5 35.2	115.9	5 10.6	116.8	4 45.9	117.7	5 00
4 50	8 32.6	115.0	8 07.2	115.9	7 41.6	116.8	7 15.9	117.8	6 50.2	118.7	4 50
40	10 39.8	116.0	10 13.3	117.0	9 46.8	117.9	9 20.0	118.8	8 53.2	119.7	40
30	12 45.7	117.1	12 18.3	118.0	11 50.7	118.9	11 23.0	119.8	10 55.1	120.8	30
20	14 50.7	118.2	14 22.2	119.2	13 53.4	120.1	13 24.6	121.0	12 55.5	121.9	20
10	16 54.1	119.4	16 24.6	120.3	15 54.7	121.2	15 24.8	122.1	14 54.5	123.0	10
4 00	18 56.2	120.6	18 25.5	121.6	17 54.5	122.5	17 23.3	123.4	16 51.9	124.3	4 00
3 50	20 56.7	121.9	20 24.7	122.9	19 52.6	123.8	19 20.2	124.7	18 47.6	125.6	3 50
40	22 55.4	123.3	22 22.3	124.2	21 48.8	125.1	21 15.2	126.0	20 41.2	126.9	40
30	24 52.2	124.7	24 17.8	125.6	23 43.2	126.5	23 08.2	127.4	22 33.0	128.3	30
20	26 47.0	126.3	26 11.3	127.2	25 35.3	128.0	24 59.0	128.9	24 22.4	129.8	20
10	28 39.5	127.8	28 02.6	128.7	27 25.1	129.6	26 47.6	130.5	26 09.4	131.4	10
3 00	30 29.5	129.5	29 51.1	130.4	29 12.3	131.3	28 33.2	132.2	27 53.8	133.1	3 00
2 50	32 16.7	131.3	31 36.9	132.2	30 56.7	133.1	30 16.3	134.0	29 35.4	134.8	2 50
40	34 01.1	133.2	33 19.8	134.1	32 38.1	135.0	31 56.2	135.8	31 13.9	136.7	40
30	35 42.1	135.2	34 59.3	136.1	34 16.2	136.9	33 32.8	137.7	32 48.9	138.6	30
20	37 19.6	137.3	36 35.3	138.2	35 50.6	139.0	35 05.6	139.8	34 20.3	140.7	20
10	38 53.0	139.5	38 07.2	140.4	37 21.0	141.2	36 34.6	142.0	35 47.7	142.8	10
2 00	40 22.3	141.9	39 34.9	142.7	38 47.1	143.5	37 59.1	144.3	37 10.8	145.0	2 00
1 50	41 46.7	144.4	40 57.8	145.2	40 08.5	146.0	39 19.1	146.7	38 29.2	147.4	1 50
40	43 06.2	147.1	42 15.7	147.8	41 24.8	148.5	40 33.9	149.2	39 42.6	149.9	40
30	44 20.0	149.8	43 27.9	150.5	42 35.7	151.2	41 43.3	151.8	40 50.7	152.5	30
20	45 27.7	152.7	44 34.3	153.4	43 40.6	154.0	42 46.8	154.6	41 52.8	155.3	20
10	46 28.9	155.8	45 34.2	156.4	44 39.2	156.9	43 44.1	157.5	42 48.8	158.2	10
1 00	47 22.3	158.9	46 27.2	159.5	45 30.9	160.0	44 34.6	160.5	43 38.2	161.0	1 00
0 50	48 10.2	162.3	47 12.9	162.7	46 15.6	163.1	45 18.2	163.5	44 20.7	164.0	0 50
40	48 49.1	165.7	47 50.9	166.0	46 52.7	166.4	45 54.4	166.7	44 56.0	167.1	40
30	49 19.8	169.2	48 20.9	169.4	47 21.9	169.7	46 22.9	170.0	45 23.9	170.3	30
20	49 42.1	172.7	48 42.5	172.9	47 43.0	173.1	46 43.4	173.3	45 43.8	173.5	20
10	49 55.5	176.3	48 55.6	176.4	47 55.7	176.5	46 55.8	176.6	45 56.0	176.7	10
0 00	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 21.5	89.1	0 43.0	88.1	1 04.5	87.2	1 25.9	86.3	6 00
5 50	2 20.0	90.9	2 41.6	90.0	3 03.1	89.0	3 24.4	88.1	3 45.8	87.1	5 50
40	4 40.0	91.8	5 01.6	90.9	5 23.0	89.9	5 44.4	89.0	6 05.6	88.0	40
30	7 00.0	92.7	7 21.6	91.8	7 43.0	90.8	8 04.5	89.9	8 25.7	88.9	30
20	9 19.8	93.6	9 41.5	92.7	10 03.0	91.7	10 24.5	90.8	10 45.6	89.9	20
10	11 39.4	94.5	12 01.4	93.6	12 23.0	92.6	12 44.5	91.7	13 05.8	90.7	10
5 00	13 59.0	95.5	14 21.0	94.5	14 42.8	93.6	15 04.4	92.6	15 25.7	91.6	5 00
4 50	16 18.2	96.5	16 40.6	95.5	17 02.5	94.5	17 24.2	93.5	17 45.6	92.5	4 50
40	18 37.2	97.5	18 59.8	96.5	19 22.0	95.5	19 43.9	94.5	20 05.4	93.5	40
30	20 55.9	98.5	21 18.8	97.5	21 41.2	96.5	22 03.4	95.5	22 25.2	94.5	30
20	23 14.3	99.5	23 37.5	98.5	24 00.2	97.5	24 22.7	96.5	24 44.6	95.5	20
10	25 32.2	100.6	25 55.8	99.6	26 18.9	98.5	26 41.8	97.5	27 04.0	96.5	10
4 00	27 49.6	101.7	28 13.6	100.7	28 37.2	99.6	29 00.4	98.6	29 23.0	97.5	4 00
3 50	30 06.4	102.9	30 31.1	101.8	30 55.9	100.7	31 18.7	99.7	31 41.6	98.6	3 50
40	32 22.6	104.1	32 47.8	103.0	33 12.4	101.9	33 36.4	100.8	33 59.8	99.7	40
30	34 38.0	105.4	35 03.9	104.3	35 29.2	103.2	35 53.8	102.0	36 17.6	100.9	30
20	36 52.6	106.7	37 19.2	105.6	37 45.0	104.5	38 10.4	103.3	38 34.8	102.2	20
10	39 06.2	108.2	39 33.7	107.1	40 00.2	105.9	40 26.2	140.7	40 51.4	103.5	10
3 00	41 18.6	109.7	41 46.9	108.6	42 14.4	107.4	42 41.3	106.1	43 07.2	104.9	3 00
2 50	43 29.7	111.4	43 59.1	110.2	44 27.7	108.9	44 55.2	107.7	45 22.1	106.4	2 50
40	45 39.4	113.1	46 09.7	111.9	46 39.3	110.6	47 08.1	109.3	47 35.7	108.0	40
30	47 47.2	115.0	48 18.8	113.8	48 49.6	112.5	49 19.4	111.1	49 48.4	109.8	30
20	49 53.0	117.1	50 25.9	115.8	50 58.1	114.5	51 29.2	113.1	51 59.2	111.7	20
10	51 46.4	119.4	52 30.9	118.0	53 04.4	116.7	53 36.9	115.3	54 08.5	113.8	10
2 00	53 57.0	121.8	54 33.1	120.5	55 08.2	119.1	55 42.4	117.6	56 15.2	116.1	2 00
1 50	55 54.2	124.5	56 32.2	123.2	57 09.0	121.7	57 45.0	120.2	58 19.8	118.7	1 50
40	57 47.5	127.5	58 27.4	126.1	59 06.3	124.7	59 44.1	123.2	60 20.8	121.6	40
30	59 35.9	130.9	60 18.0	129.4	60 59.1	127.9	61 39.2	126.4	62 18.0	124.8	30
20	61 19.0	134.6	62 03.3	133.2	62 46.8	131.7	63 29.3	130.1	64 10.5	128.4	20
10	62 55.0	138.7	63 42.1	137.3	64 28.0	135.8	65 13.2	134.2	65 57.0	132.6	10
1 00	64 23.5	143.2	65 12.9	141.9	66 01.5	140.5	66 49.4	138.9	67 36.0	137.3	1 00
0 50	65 42.4	148.3	66 34.5	147.0	67 25.8	145.7	68 16.4	144.3	69 06.1	142.8	0 50
40	66 50.3	153.8	67 44.7	152.7	68 38.6	151.5	69 32.2	150.3	70 24.8	148.9	40
30	67 45.5	159.8	68 42.2	158.9	69 38.5	158.0	70 34.5	156.9	71 30.2	155.8	30
20	68 26.4	166.3	69 24.8	165.7	70 23.0	165.0	71 21.2	164.2	72 19.0	163.3	20
10	68 51.5	173.1	69 51.1	172.7	70 50.7	172.4	71 50.2	172.0	72 49.7	171.5	10
0 00	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10					0 11.2	82.6	0 32.8	81.7	0 54.5	80.7	6 10
6 00	1 47.4	85.3	2 08.8	84.4	2 30.2	83.5	2 51.5	82.5	3 12.8	81.6	6 00
5 50	4 07.1	86.2	4 28.2	85.3	4 49.5	84.3	5 10.5	83.4	5 31.5	82.5	5 50
40	6 26.8	87.1	6 48.0	86.2	7 08.9	85.2	7 29.8	84.3	7 50.4	83.3	40
30	8 46.8	88.0	9 07.8	87.1	9 28.5	86.1	9 49.2	85.1	10 09.6	84.2	30
20	11 06.7	88.9	11 27.6	87.9	11 48.3	87.0	12 08.9	86.0	12 29.1	85.0	20
10	13 26.8	89.8	13 47.6	88.8	14 08.2	87.8	14 28.6	86.9	14 48.7	85.9	10
5 00	15 46.7	90.7	16 07.6	89.7	16 28.2	88.7	16 48.5	87.7	17 08.4	86.7	5 00
4 50	18 06.8	91.6	18 27.7	90.6	18 48.2	89.6	19 08.4	88.6	19 28.3	87.6	4 50
40	20 26.7	92.5	20 47.7	91.5	21 08.3	90.5	21 28.5	89.5	21 48.2	88.5	40
30	22 46.7	93.5	23 07.7	92.4	23 28.2	91.4	23 48.4	90.4	24 08.2	89.3	30
20	25 06.3	94.4	25 27.5	93.3	25 48.2	92.3	26 08.5	91.3	26 28.2	90.2	20
10	27 25.8	95.4	27 47.2	94.3	28 08.1	93.3	28 28.4	92.2	28 48.3	91.1	10
4 00	29 45.1	96.4	30 06.8	95.3	30 27.8	94.3	30 48.4	93.2	31 08.2	92.1	4 00
3 50	32 04.2	97.5	32 26.0	96.4	32 47.4	95.3	33 08.1	94.2	33 28.1	93.0	3 50
40	34 22.7	98.6	34 45.1	97.5	35 06.7	96.3	35 27.7	95.2	35 47.9	94.0	40
30	36 41.1	99.8	37 03.8	98.6	37 25.7	97.4	37 46.9	96.3	38 07.6	95.1	30
20	38 58.7	101.0	39 22.0	99.8	39 44.4	98.6	40 06.1	97.4	40 26.9	96.1	20
10	41 16.0	102.3	41 39.7	101.1	42 02.6	99.8	42 24.7	98.6	42 45.9	97.3	10
3 00	43 32.3	103.7	43 56.8	102.4	44 20.3	101.1	44 43.0	99.8	45 04.6	98.5	3 00
2 50	45 48.0	105.1	46 13.2	103.8	46 37.4	102.4	47 00.6	101.1	47 23.0	99.8	2 50
40	48 02.6	106.7	48 28.7	105.4	48 53.8	104.0	49 17.8	102.6	49 40.7	101.2	40
30	50 16.2	108.4	50 43.2	107.0	51 09.1	105.6	51 33.9	104.2	51 57.7	102.7	30
20	52 28.3	110.3	52 56.6	108.8	53 23.5	107.3	53 49.3	105.8	54 13.9	104.3	20
10	54 38.8	112.3	55 08.2	110.8	55 36.4	109.3	56 03.4	107.7	56 29.1	106.0	10
2 00	56 47.2	114.6	57 18.3	113.0	57 47.9	111.4	58 16.2	109.7	58 42.9	108.0	2 00
1 50	59 53.4	117.1	60 25.9	115.5	59 57.1	113.8	60 26.9	112.0	60 55.3	110.2	1 50
40	60 56.4	119.9	61 31.0	118.2	62 04.0	116.4	62 35.7	114.6	63 05.6	112.7	40
30	62 56.0	123.1	63 32.4	121.3	64 07.6	119.5	64 41.3	117.6	65 13.5	115.6	30
20	64 50.6	126.7	65 29.6	124.9	66 07.4	123.0	66 43.6	121.0	67 17.9	118.9	20
10	66 40.0	130.9	67 21.5	129.0	68 02.2	127.0	68 41.0	125.0	69 18.2	122.8	10
1 00	68 22.0	135.6	69 07.0	133.8	69 50.3	131.8	70 32.6	129.7	71 12.8	127.5	1 00
0 50	69 55.2	141.1	70 43.2	139.3	71 30.2	137.4	72 15.5	135.3	72 59.7	133.0	0 50
40	71 17.0	147.4	72 08.7	145.7	72 59.0	143.9	73 48.7	141.9	74 36.5	139.8	40
30	72 25.2	154.5	73 20.0	153.1	74 14.0	151.5	75 07.0	149.7	75 59.5	147.8	30
20	73 16.8	162.4	74 14.3	161.4	75 11.4	160.2	76 08.2	158.8	77 04.1	157.4	20
10	73 49.0	171.0	74 48.3	170.5	75 47.6	169.9	76 46.7	169.1	77 45.6	168.3	10
0 00	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 04.6	76.0	0 26.6	75.2	6 20
10	1 16.1	79.8	1 37.6	78.8	1 59.3	77.9	2 20.7	76.9	2 42.3	76.0	10
6 00	3 34.1	80.6	3 55.3	79.7	4 16.4	78.8	4 37.4	77.8	4 58.4	76.9	6 00
5 50	5 52.4	81.5	6 13.1	80.6	6 34.0	79.6	6 54.6	78.7	7 15.1	77.8	5 50
40	8 11.1	82.4	8 31.5	81.4	8 51.9	80.5	9 12.1	79.5	9 32.1	78.6	40
30	10 30.0	83.2	10 50.1	82.3	11 10.2	81.3	11 29.6	80.3	11 49.6	79.4	30
20	12 49.2	84.1	13 09.1	83.1	13 28.7	82.1	13 48.1	81.2	14 07.3	80.2	20
10	15 08.6	84.9	15 28.1	83.9	15 47.6	82.9	16 06.7	82.0	16 25.6	81.0	10
5 00	17 28.2	85.7	17 47.6	84.8	18 06.7	83.8	18 25.5	82.8	18 43.9	81.8	5 00
4 50	19 47.9	86.6	20 07.0	85.6	20 25.9	84.6	20 44.4	83.6	21 02.7	82.5	4 50
40	22 07.7	87.4	22 26.8	86.4	22 45.4	85.4	23 03.7	84.4	23 21.6	83.3	40
30	24 27.6	88.3	24 46.5	87.3	25 05.1	86.2	25 23.1	85.2	25 40.8	84.1	30
20	26 47.7	89.2	27 06.5	88.1	27 24.9	87.0	27 42.8	86.0	28 00.2	84.9	20
10	29 07.7	90.1	29 26.4	89.0	29 44.8	87.8	30 02.6	86.8	30 19.8	85.7	10
4 00	31 27.7	91.0	31 46.6	89.9	32 04.8	88.7	32 22.4	87.6	32 39.4	86.5	4 00
3 50	33 47.6	91.9	34 06.5	90.8	34 24.8	89.6	34 42.4	88.4	34 59.2	87.3	3 50
40	36 07.6	92.9	36 26.6	91.7	36 44.8	90.5	37 02.4	89.3	37 19.2	88.1	40
30	38 27.4	93.9	38 46.4	92.7	39 04.9	91.4	39 22.4	90.2	39 39.1	88.9	30
20	40 47.0	94.9	41 06.4	93.7	41 24.9	92.4	41 42.5	91.1	41 59.2	89.8	20
10	43 06.4	96.0	43 26.0	94.7	43 44.6	93.4	44 02.4	92.1	44 19.2	90.7	10
3 00	45 25.5	97.2	45 45.5	95.8	46 04.4	94.5	46 22.3	93.1	46 39.2	91.7	3 00
2 50	47 44.3	98.4	48 04.5	97.0	48 23.9	95.6	48 42.1	94.1	48 59.1	92.7	2 50
40	50 02.5	99.7	50 23.5	98.2	50 43.1	96.8	51 01.6	95.3	51 19.0	93.7	40
30	52 20.2	101.1	52 41.7	99.6	53 02.0	98.0	53 20.9	96.5	53 38.6	94.8	30
20	54 37.3	102.7	54 59.6	101.1	55 20.5	99.4	55 39.9	97.8	55 58.1	96.1	20
10	56 53.5	104.4	57 16.5	102.7	57 38.1	100.9	57 58.4	99.2	58 17.5	97.4	10
2 00	59 08.6	106.3	59 32.8	104.5	59 55.4	102.6	60 16.3	100.7	60 35.8	98.8	2 00
1 50	61 22.3	108.4	61 47.7	106.5	62 11.4	104.5	62 33.5	102.5	62 53.9	100.5	1 50
40	63 34.2	110.8	64 01.3	108.7	64 26.4	106.6	64 49.7	104.5	65 11.0	102.3	40
30	65 44.0	113.5	66 12.7	111.3	66 39.7	109.1	67 04.5	106.8	67 27.2	104.4	30
20	67 50.8	116.7	68 22.0	114.4	68 50.8	112.0	69 17.7	109.5	69 42.3	106.9	20
10	69 53.6	120.5	70 27.4	118.1	70 59.0	115.5	71 28.2	112.8	71 55.2	109.9	10
1 00	71 51.6	125.0	72 28.7	122.5	73 03.1	119.7	73 35.5	116.8	74 05.2	113.6	1 00
0 50	73 42.2	130.6	74 23.0	127.9	75 01.5	124.9	75 37.5	121.8	76 11.0	118.4	0 50
40	75 23.5	137.3	76 08.6	134.7	76 51.6	131.6	77 32.5	128.4	78 10.7	124.7	40
30	76 50.7	145.6	77 40.7	143.1	78 29.0	140.2	79 15.5	137.0	79 59.5	133.1	30
20	77 59.7	155.6	78 54.7	153.6	79 48.4	151.2	80 40.9	148.4	81 32.0	144.9	20
10	78 44.4	167.3	79 43.0	166.1	80 41.2	164.7	81 39.1	163.0	82 36.3	160.8	10
0 00	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 05.0	69.6	6 30
20	0 48.6	74.2	1 10.7	73.3	1 32.7	72.4	1 54.8	71.4	2 16.7	70.5	20
10	3 03.8	75.1	3 25.1	74.2	3 46.4	73.2	4 07.8	72.3	4 29.1	71.4	10
6 00	5 19.3	76.0	5 40.1	75.0	6 00.9	74.1	6 21.5	73.1	6 42.0	72.2	6 00
5 50	7 35.4	76.8	7 55.8	75.8	8 15.8	74.9	9 35.7	73.9	8 55.6	73.0	5 50
40	9 52.0	77.6	10 11.6	76.6	10 31.2	75.7	10 50.5	74.7	11 09.8	73.8	40
30	12 08.9	78.4	12 28.1	77.4	12 47.1	76.5	13 05.9	75.5	13 24.6	74.5	30
20	14 26.4	79.2	14 45.0	78.2	15 03.5	77.2	15 21.7	76.3	15 39.7	75.3	20
10	16 44.1	80.0	17 02.4	79.0	17 20.2	78.0	17 38.0	77.0	17 55.3	76.0	10
5 00	19 02.2	80.8	19 19.9	79.7	19 37.5	78.7	19 54.6	77.7	20 11.4	76.7	5 00
4 50	21 20.5	81.5	21 37.9	80.5	21 54.9	79.5	22 11.6	78.4	22 27.9	77.4	4 50
40	23 39.1	82.3	23 56.1	81.1	24 12.8	80.2	24 28.9	79.1	24 44.7	78.1	40
30	25 58.1	83.0	26 14.8	82.0	26 30.8	80.9	26 46.7	79.8	27 01.9	78.7	30
20	28 17.1	83.8	28 33.4	82.7	28 49.3	81.6	29 04.6	80.5	29 19.4	79.4	20
10	30 36.4	84.5	30 52.5	83.4	31 07.9	82.3	31 22.8	81.2	31 37.2	80.1	10
4 00	32 55.9	85.3	33 11.6	84.2	33 26.9	83.0	33 41.3	81.9	33 55.2	80.7	4 00
3 50	35 15.6	86.1	35 31.1	84.9	35 45.9	83.7	36 00.1	82.5	36 13.5	81.3	3 50
40	37 35.3	86.9	37 50.6	85.7	38 05.2	84.4	38 19.0	83.2	38 32.0	82.0	40
30	39 55.2	87.7	40 10.4	86.4	40 24.6	85.2	40 38.1	83.9	40 50.9	82.6	30
20	42 15.2	88.5	42 30.1	87.2	42 44.3	85.9	42 57.4	84.6	43 09.7	83.2	20
10	44 35.1	89.4	44 50.1	88.0	45 04.1	86.6	45 16.9	85.3	45 29.0	83.9	10
3 00	46 55.2	90.3	47 10.0	88.9	47 23.9	87.4	47 36.6	86.0	47 48.2	84.5	3 00
2 50	49 15.2	91.2	49 30.1	89.7	49 43.8	88.2	49 56.8	86.7	50 07.8	85.2	2 50
40	51 35.2	92.2	51 50.1	90.6	52 03.9	89.0	52 16.1	87.4	52 27.3	85.8	40
30	53 55.1	93.2	54 10.2	91.6	54 23.8	89.9	54 36.1	88.2	54 47.0	86.5	30
20	56 14.8	94.3	56 30.0	92.6	56 43.9	90.8	56 56.0	89.0	57 06.8	87.2	20
10	58 34.4	95.5	58 50.0	93.7	59 03.9	91.8	59 16.0	89.9	59 26.9	88.0	10
2 00	60 53.6	96.9	61 09.5	94.9	61 23.8	92.9	61 36.1	90.8	61 46.7	88.7	2 00
1 50	63 12.2	98.3	63 29.0	96.2	63 43.5	94.0	63 56.1	91.8	64 06.7	89.6	1 50
40	65 30.7	100.0	65 47.9	97.7	66 03.2	95.3	66 16.0	92.9	66 26.7	90.4	40
30	67 48.0	102.0	68 06.5	99.4	68 22.4	96.8	68 35.8	94.2	68 46.7	91.4	30
20	70 04.6	104.2	70 24.1	101.3	70 41.3	98.5	70 55.4	95.7	71 06.7	92.6	20
10	72 19.2	106.9	72 40.8	103.8	72 59.2	100.6	73 14.5	97.4	73 26.6	93.9	10
1 00	74 32.3	110.4	74 55.8	106.8	75 16.4	103.2	75 33.1	99.4	75 46.1	95.5	1 00
0 50	76 41.5	114.8	77 08.3	110.8	77 31.7	106.6	77 50.8	102.1	78 05.7	97.5	0 50
40	78 45.8	120.6	79 17.0	116.1	79 44.2	111.2	80 06.6	106.0	80 23.7	100.3	40
30	80 41.2	128.9	81 18.5	123.9	81 51.0	118.2	82 19.0	111.7	82 40.5	104.5	30
20	82 20.6	140.8	83 06.5	135.7	83 48.4	129.4	84 24.8	121.6	84 53.6	112.2	20
10	83 32.8	158.0	84 28.0	154.2	85 21.3	149.0	87 11.1	141.4	85 54.9	130.0	10
0 00	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30	0 27.7	68.7	0 50.4	67.8	1 13.0	66.9	1 35.8	65.9	1 58.4	65.0	6 30
20	2 38.6	69.6	3 00.5	68.7	3 22.3	67.7	3 44.1	66.8	4 05.8	65.8	20
10	4 50.1	70.4	5 11.2	69.5	5 32.2	68.5	5 53.2	67.6	6 13.9	66.6	10
6 00	7 02.4	71.2	7 22.7	70.3	7 42.9	69.3	8 02.9	68.4	8 22.8	67.4	6 00
5 50	9 15.2	72.0	9 34.9	71.1	9 54.2	70.1	10 13.5	69.1	10 32.5	68.2	5 50
40	11 28.8	72.8	11 47.7	71.8	12 06.3	70.9	12 24.6	69.9	12 42.8	68.9	40
30	13 42.8	73.6	14 00.9	72.6	14 18.7	71.6	14 36.4	70.6	14 53.7	69.6	30
20	15 57.4	74.3	16 14.7	73.3	16 32.0	72.3	16 48.7	71.3	17 05.4	70.3	20
10	18 12.3	75.0	18 29.2	74.0	18 45.5	73.0	19 01.7	71.9	19 17.3	70.9	10
5 00	20 27.9	75.7	20 43.9	74.6	20 59.7	73.6	21 15.0	72.6	21 30.0	71.5	5 00
4 50	22 43.7	76.3	22 59.2	75.3	23 14.2	74.2	23 28.8	73.2	23 43.0	72.1	4 50
40	25 00.0	77.0	25 14.9	75.9	25 29.2	74.8	25 43.0	73.8	25 56.5	72.7	40
30	27 16.6	77.6	27 30.8	76.5	27 44.5	75.4	27 57.7	74.3	28 10.4	73.2	30
20	29 33.5	78.3	29 47.2	77.1	30 00.3	76.0	30 12.7	74.9	30 24.6	73.7	20
10	31 50.7	78.9	32 03.8	77.7	32 16.2	76.6	32 28.2	75.4	32 39.2	74.2	10
4 00	34 08.4	79.5	34 20.8	78.3	34 32.7	77.1	34 43.8	75.9	34 54.2	74.7	4 00
3 50	36 26.2	80.1	36 38.2	78.9	36 49.2	77.7	36 59.8	76.4	37 09.4	75.2	3 50
40	38 44.3	80.7	38 55.6	79.4	39 06.3	78.2	39 16.0	76.9	39 24.9	75.6	40
30	41 02.6	81.3	41 13.5	80.0	41 23.4	78.7	41 32.6	77.4	41 40.7	76.1	30
20	43 21.1	81.9	43 31.5	80.5	43 40.9	79.2	43 49.2	77.8	43 56.7	76.4	20
10	45 39.7	82.5	45 49.7	81.1	45 58.4	79.6	46 06.2	78.2	46 12.8	76.8	10
3 00	47 58.7	83.1	48 08.1	81.6	48 16.4	80.1	48 23.3	78.6	48 29.3	77.1	3 00
2 50	50 17.7	83.6	50 26.7	82.1	50 34.2	80.5	50 40.8	78.9	50 45.8	77.4	2 50
40	52 37.1	84.2	52 45.4	82.6	52 52.6	81.9	52 58.2	79.3	53 02.6	77.6	40
30	54 56.5	84.8	55 04.5	83.1	55 10.9	81.3	55 16.0	79.6	55 19.4	77.8	30
20	57 16.0	85.4	57 23.5	83.6	57 29.5	81.7	57 33.6	79.9	57 36.3	78.0	20
10	59 35.4	86.0	59 42.7	84.1	59 48.0	82.1	59 51.6	80.1	59 53.2	78.1	10
2 00	61 55.4	86.6	62 02.1	84.5	62 06.7	82.4	62 09.5	80.3	62 10.3	78.1	2 00
1 50	64 15.2	87.3	64 21.5	85.0	64 25.6	82.7	64 27.7	80.4	64 27.4	78.1	1 50
40	66 35.2	88.0	66 41.1	85.5	66 44.6	82.9	66 45.6	80.4	66 44.4	77.9	40
30	68 55.0	88.7	69 00.7	85.9	69 03.5	83.1	69 03.7	80.3	69 01.1	77.6	30
20	71 15.2	89.5	71 20.4	86.4	71 22.8	83.3	71 21.7	80.1	71 17.8	77.0	20
10	73 35.0	90.4	73 40.2	86.9	73 41.5	83.3	73 40.0	79.7	73 34.0	76.2	10
1 00	75 55.2	91.4	75 59.9	87.3	76 00.9	83.1	75 57.1	79.0	75 49.6	75.0	1 00
0 50	78 15.2	92.7	78 20.0	87.8	78 19.7	82.8	78 15.0	77.9	78 04.3	73.2	0 50
40	80 34.8	94.3	80 40.0	88.2	80 38.6	82.0	80 30.9	76.0	80 17.4	70.2	40
30	82 54.0	96.7	83 00.0	88.7	82 57.0	80.5	82 46.5	72.6	82 26.5	65.2	30
20	85 12.7	101.2	85 20.0	89.1	85 14.5	77.0	84 57.0	65.8	84 29.6	56.1	20
10	87 27.3	112.6	87 40.0	89.6	87 28.1	66.2	86 56.4	48.8	86 12.8	37.1	10
0 00	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	87 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour. Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 20. 0	90. 9	1 58. 6	91. 8	1 36. 9	92. 8	1 15. 4	93. 7	0 53. 7	94. 6	5 50
40	4 40. 0	91. 8	4 18. 4	92. 7	3 56. 7	93. 7	3 35. 0	94. 6	3 13. 1	95. 5	40
30	7 00. 0	92. 7	6 38. 2	93. 6	6 16. 4	94. 6	5 54. 5	95. 5	5 32. 5	96. 4	30
20	9 19. 8	93. 6	8 57. 9	94. 6	8 35. 8	95. 5	8 13. 8	96. 5	7 51. 5	97. 4	20
10	11 39. 4	94. 5	11 17. 4	95. 5	10 55. 2	96. 4	10 32. 8	97. 4	10 10. 2	98. 3	10
5 00	13 59. 0	95. 5	13 36. 7	96. 5	13 14. 2	97. 4	12 51. 5	98. 4	12 28. 6	99. 3	5 00
4 50	16 18. 2	96. 5	15 55. 8	97. 4	15 32. 9	98. 4	15 09. 9	99. 4	14 46. 6	100. 3	4 50
40	18 37. 2	97. 5	18 14. 4	98. 4	17 51. 2	99. 4	17 27. 8	100. 4	17 04. 1	101. 3	40
30	20 55. 9	98. 5	20 32. 8	99. 4	20 09. 2	100. 4	19 45. 4	101. 4	19 21. 2	102. 4	30
20	23 14. 3	99. 5	22 50. 7	100. 5	22 26. 6	101. 5	22 02. 4	102. 5	21 37. 6	103. 5	20
10	25 32. 2	100. 6	25 08. 1	101. 6	24 43. 7	102. 6	24 18. 8	103. 6	23 53. 6	104. 6	10
4 00	27 49. 6	101. 7	27 25. 0	102. 7	27 00. 0	103. 8	26 34. 6	104. 8	26 08. 7	105. 8	4 00
3 50	30 06. 4	102. 9	29 41. 3	103. 9	29 15. 6	105. 0	28 49. 6	106. 0	28 23. 1	107. 0	3 50
40	32 22. 6	104. 1	31 56. 8	105. 1	31 30. 5	106. 2	31 03. 8	107. 3	30 36. 5	108. 3	40
30	34 38. 0	105. 4	34 11. 6	106. 5	33 44. 7	107. 6	33 17. 1	108. 7	32 48. 8	109. 7	30
20	36 52. 6	106. 7	36 25. 4	107. 9	35 57. 5	109. 0	35 29. 2	110. 1	35 00. 2	111. 1	20
10	39 06. 2	108. 2	38 38. 2	109. 3	38 09. 4	110. 4	37 40. 2	111. 6	37 10. 2	112. 6	10
3 00	41 18. 6	109. 7	40 49. 6	110. 9	40 19. 9	112. 0	39 49. 7	113. 2	39 18. 7	114. 3	3 00
2 50	43 29. 7	111. 4	42 59. 8	112. 6	42 29. 0	113. 7	41 57. 6	114. 9	41 25. 5	116. 0	2 50
40	45 39. 4	113. 1	45 08. 2	114. 4	44 36. 3	115. 6	44 03. 7	116. 7	43 30. 3	117. 9	40
30	47 47. 2	115. 0	47 14. 7	116. 3	46 41. 4	117. 5	46 07. 6	118. 7	45 33. 0	119. 9	30
20	49 53. 0	117. 1	49 19. 2	118. 4	48 44. 6	119. 6	48 09. 3	120. 8	47 33. 0	122. 0	20
10	51 56. 4	119. 4	51 21. 1	120. 7	50 44. 9	121. 9	50 08. 0	123. 2	49 30. 2	124. 4	10
2 00	53 57. 0	121. 8	53 20. 0	123. 2	52 42. 1	124. 5	52 03. 6	125. 7	51 24. 0	126. 9	2 00
1 50	55 54. 2	124. 5	55 15. 5	125. 9	54 35. 8	127. 2	53 55. 2	128. 5	53 14. 0	129. 7	1 50
40	57 47. 5	127. 5	57 06. 7	128. 9	56 25. 0	130. 2	55 42. 6	131. 5	54 59. 4	132. 7	40
30	59 35. 9	130. 9	58 53. 0	132. 3	58 09. 4	133. 6	57 24. 9	134. 8	56 39. 5	136. 0	30
20	61 19. 0	134. 6	60 33. 7	135. 9	59 47. 7	137. 2	59. 01. 1	138. 4	58 13. 6	139. 6	20
10	62 55. 0	138. 7	62 07. 6	140. 0	61 19. 2	141. 2	60 30. 2	142. 4	59 40. 6	143. 5	10
1 00	64 23. 5	143. 2	63 33. 4	144. 5	62 42. 6	145. 7	61 51. 5	146. 8	60 59. 6	147. 8	1 00
0 50	65 42. 4	148. 3	64 49. 8	149. 4	63 56. 8	150. 5	63 03. 2	151. 5	62 09. 4	152. 5	0 50
40	66 50. 3	153. 8	65 55. 4	154. 8	65 00. 0	155. 8	64 04. 7	156. 6	63 08. 7	157. 4	40
30	67 45. 5	159. 8	66 48. 5	160. 6	65 51. 4	161. 4	64 54. 0	162. 1	63 56. 5	162. 8	30
20	68 26. 4	166. 3	67 27. 8	166. 9	66 29. 0	167. 4	65 30. 3	167. 9	64 31. 4	168. 3	20
10	68 51. 5	173. 1	67 51. 9	173. 4	66 52. 2	173. 6	65 52. 5	173. 9	64 52. 8	174. 1	10
0 00	69 0. 0	180. 0	68 0. 0	180. 0	67 0. 0	180. 0	66 0. 0	180. 0	65 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 32.1	95.6	0 10.4	96.5							5 50
40	2 51.3	96.5	2 29.5	97.4	2 0.75	98.3	1 45.6	99.3	1 23.5	100.2	40
30	5 10.4	97.4	4 48.2	98.3	4 25.9	99.2	4 03.6	100.2	3 41.1	101.1	30
20	7 29.0	98.3	7 06.6	99.3	6 44.0	100.2	6 21.3	101.1	5 58.3	102.0	20
10	9 47.6	99.2	9 24.6	100.2	9 01.6	101.1	8 38.4	102.1	8 15.1	103.0	10
5 00	12 05.4	100.2	11 42.2	101.2	11 18.7	102.1	10 55.1	103.1	10 31.2	104.0	5 00
4 50	14 23.1	101.2	13 59.3	102.2	13 35.3	103.1	13 11.3	104.0	12 46.8	105.0	4 50
40	16 40.1	102.3	16 16.0	103.2	15 51.5	104.2	15 26.8	105.1	15 01.7	106.1	40
30	18 56.8	103.3	18 32.0	104.3	18 06.9	105.3	17 41.6	106.2	17 15.9	107.2	30
20	21 12.6	104.4	20 47.4	105.4	20 21.7	106.4	19 55.7	107.3	19 29.3	108.3	20
10	23 28.0	105.6	23 02.0	106.6	22 35.5	107.6	22 08.9	108.5	21 41.9	109.5	10
4 00	25 42.5	106.8	25 15.8	107.8	24 48.7	108.8	24 21.3	109.7	23 53.4	110.7	4 00
3 50	27 56.2	108.0	27 28.8	109.0	27 00.8	110.0	26 32.5	111.0	26 03.7	112.0	3 50
40	30 08.7	109.3	29 40.6	110.4	29 11.8	111.4	28 42.7	112.4	28 13.1	113.4	40
30	32 20.5	110.7	31 51.2	111.8	31 21.6	112.8	30 51.5	113.8	30 21.0	114.8	30
20	34 30.6	112.1	34 00.7	113.2	33 30.1	114.2	32 59.0	115.3	32 27.3	116.3	20
10	36 39.8	113.7	36 08.6	114.8	35 36.9	115.8	35 04.8	116.9	34 32.0	117.9	10
3 00	38 47.0	115.4	38 14.9	116.4	37 42.1	117.5	37 08.8	118.6	36 34.8	119.6	3 00
2 50	40 52.8	117.1	40 19.3	118.2	39 45.3	119.3	39 10.7	120.3	38 35.5	121.4	2 50
40	42 56.2	119.0	42 21.6	120.1	41 46.3	121.2	41 10.4	122.3	40 33.9	123.3	40
30	44 57.6	121.0	44 21.5	122.1	43 44.7	123.2	43 07.4	124.3	42 29.5	125.4	30
20	46 56.1	123.2	46 18.7	124.3	45 40.5	125.4	45 01.6	126.5	44 22.1	127.6	20
10	49 51.8	125.6	49 12.6	126.7	47 32.8	127.8	46 52.4	128.9	46 11.3	130.0	10
2 00	50 43.8	128.1	50 03.1	129.3	49 21.6	130.4	48 39.5	131.5	47 56.6	132.5	2 00
1 50	52 32.1	130.9	51 49.4	132.0	51 06.0	133.1	50 22.1	134.2	49 37.6	135.3	1 50
40	54 15.4	133.9	53 31.0	135.0	52 45.8	136.1	52 00.1	137.2	51 13.5	138.2	40
30	55 53.8	137.2	55 07.0	138.3	54 19.9	139.4	53 32.2	140.4	52 44.1	141.4	30
20	57 25.5	140.7	56 37.1	141.8	55 47.9	142.8	54 58.4	143.8	54 08.2	144.8	20
10	58 50.6	144.6	57 59.9	145.6	57 08.7	146.6	56 17.2	147.6	55 25.2	148.5	10
1 00	60 07.3	148.8	59 14.9	149.8	58 21.7	150.7	57 28.4	151.5	56 34.5	152.4	1 00
0 50	61 15.2	153.4	60 20.5	154.2	59 25.6	155.0	58 30.4	155.8	57 34.8	156.6	0 50
40	62 12.5	158.2	61 16.4	159.0	60 19.7	159.7	59 23.4	160.3	58 25.9	160.9	40
30	62 58.8	163.4	62 00.8	164.0	61 02.9	164.5	60 04.7	165.0	59 06.5	165.5	30
20	63 32.4	168.8	62 33.5	169.2	61 34.4	169.6	60 35.3	169.9	59 36.0	170.2	20
10	63 53.1	174.3	62 53.3	174.5	61 53.6	174.7	60 53.8	174.9	59 54.0	175.1	10
0 00	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 01.6	101.1	0 39.5	102.1	0 17.5	103.0					5 40
30	3 18.7	102.1	2 56.2	103.0	2 33.8	103.9	2 10.8	104.8	1 48.5	105.8	30
20	5 35.4	103.0	5 12.5	103.9	4 49.3	104.8	4 26.1	105.7	4 02.9	106.7	20
10	7 51.6	103.9	7 28.1	104.9	7 04.5	105.8	6 40.7	106.7	6 16.8	107.6	10
5 00	10 07.3	104.9	9 43.2	105.9	9 18.8	106.8	8 54.4	107.7	8 29.7	108.6	5 00
4 50	12 22.3	105.9	11 57.4	106.9	11 32.6	107.8	11 07.4	108.7	10 42.1	109.6	4 50
40	14 36.6	107.0	14 11.1	108.0	13 45.4	108.9	13 19.6	109.8	12 53.5	110.7	40
30	16 50.1	108.1	16 23.8	109.1	15 57.6	110.0	15 30.9	110.9	15 04.1	111.8	30
20	19 02.8	109.2	18 35.9	110.2	18 08.7	111.1	17 41.2	112.1	17 13.5	113.0	20
10	21 14.5	110.4	20 46.7	111.4	20 18.8	112.3	19 50.5	113.3	19 21.9	114.2	10
4 00	23 25.2	111.7	22 56.8	112.6	21 27.8	113.6	21 58.5	114.5	20 28.9	115.5	4 00
3 50	25 34.7	113.0	25 05.2	113.9	24 35.5	114.9	24 05.2	115.8	23 34.7	116.8	3 50
40	27 43.1	114.3	27 12.7	115.3	26 41.8	116.3	26 10.6	117.2	25 39.0	118.2	40
30	29 49.9	115.8	29 18.4	116.8	28 46.7	117.7	28 14.4	118.6	27 41.7	119.6	30
20	31 55.3	117.3	31 22.7	118.3	30 49.7	119.2	30 16.3	120.2	29 42.4	121.2	20
10	33 58.8	118.9	33 25.1	119.9	32 51.0	120.9	32 16.3	121.8	31 41.3	122.8	10
3 00	36 00.4	120.6	35 25.5	121.6	34 50.1	122.6	34 14.1	123.5	33 37.8	124.5	3 00
2 50	37 59.8	122.4	37 23.5	123.4	36 46.9	124.4	36 09.7	125.4	35 31.9	126.4	2 50
40	39 56.7	124.4	39 19.2	125.4	38 41.0	126.4	38 02.4	127.3	37 23.3	128.3	40
30	41 50.9	126.4	41 11.9	127.4	40 32.4	128.4	39 52.2	129.4	39 11.7	130.4	30
20	43 42.0	128.6	43 01.6	129.6	42 20.4	130.6	41 38.7	131.6	40 56.7	132.5	20
10	45 29.6	131.0	44 47.4	132.0	44 04.8	133.0	43 21.6	134.0	42 38.0	134.9	10
2 00	47 13.3	133.5	46 29.5	134.5	45 45.2	135.5	45 00.3	136.5	44 14.9	137.4	2 00
1 50	48 52.5	136.3	48 07.0	137.2	47 21.0	138.2	46 34.4	139.1	45 47.6	140.0	1 50
40	50 26.7	139.2	49 39.5	140.1	48 51.7	141.1	48 03.4	142.0	47 14.7	142.8	40
30	51 55.3	142.3	51 06.1	143.2	50 16.8	144.2	49 26.8	145.0	48 36.5	145.7	30
20	53 17.7	145.7	52 26.9	146.6	51 35.4	147.4	50 43.8	148.2	49 51.8	149.0	20
10	54 32.9	149.3	53 40.2	150.1	52 47.4	150.9	51 54.0	151.7	51 00.5	152.4	10
1 00	55 40.4	153.1	54 46.2	153.9	53 51.4	154.6	52 56.6	155.3	52 01.5	155.9	1 00
0 50	56 39.2	157.2	55 43.4	157.9	54 47.4	158.5	53 51.0	159.1	52 54.5	159.6	0 50
40	57 28.8	161.5	56 31.6	162.0	55 34.1	162.5	54 36.5	163.0	53 38.9	163.5	40
30	58 08.1	165.9	57 09.6	166.3	56 11.2	166.7	55 12.6	167.1	54 14.0	167.5	30
20	58 36.8	170.5	57 37.6	170.8	56 38.1	171.1	55 38.8	171.4	54 39.4	171.6	20
10	58 54.2	175.2	57 54.4	175.4	56 54.5	175.5	55 54.7	175.7	54 54.9	175.8	10
0 00	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——15

22° 27.8

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 25.8	106.7	1 03.1	107.6	0 40.4	108.6	0 17.7	109.5	.		5 30
20	3 39.7	107.6	3 16.2	108.5	2 52.9	109.5	2 29.4	110.4	2 05.9	111.3	20
10	5 52.7	108.6	5 28.7	109.5	5 04.5	110.4	4 40.2	111.3	4 15.9	112.2	10
5 00	8 05.2	109.6	7 40.3	110.5	7 15.4	111.4	6 50.2	112.3	6 25.1	113.2	5 00
4 50	10 16.7	110.6	9 51.1	111.5	9 25.1	112.4	8 59.4	113.4	8 33.3	114.2	4 50
40	12 27.3	111.7	12 00.8	112.6	11 34.3	113.5	11 07.4	114.4	10 40.4	115.3	40
30	14 37.0	112.8	14 09.7	113.7	13 42.1	114.6	13 14.4	115.5	12 46.5	116.4	30
20	16 45.6	113.9	16 17.4	114.8	15 48.9	115.7	15 20.2	116.7	14 51.3	117.6	20
10	18 53.0	115.1	18 23.8	116.0	17 54.4	116.9	17 24.7	117.9	16 54.7	118.8	10
4 00	20 59.2	116.4	20 28.9	117.3	19 58.6	118.2	19 27.8	119.1	18 56.8	120.0	4 00
3 50	23 03.9	117.7	22 32.7	118.6	22 01.1	119.5	21 29.4	120.5	20 57.2	121.4	3 50
40	25 07.1	119.1	24 34.8	120.0	24 02.2	120.9	23 29.2	121.9	22 55.9	122.8	40
30	27 08.6	120.6	26 35.1	121.5	26 01.3	122.4	25 27.1	123.3	24 52.7	124.2	30
20	29 08.3	122.1	28 33.5	123.0	27 58.6	124.0	27 23.1	124.9	26 47.4	125.8	20
10	31 05.7	123.7	30 29.9	124.7	29 53.7	125.6	29 16.9	126.5	28 39.8	127.4	10
3 00	33 01.1	125.4	32 23.9	126.4	31 46.3	127.3	31 08.2	128.2	30 29.8	129.1	3 00
2 50	34 53.9	127.3	34 15.2	128.2	33 36.2	129.1	32 56.8	130.0	32 17.2	130.9	2 50
40	36 43.8	129.2	36 03.8	130.2	35 23.4	131.1	34 42.5	132.0	34 01.4	132.8	40
30	38 30.8	131.3	37 49.3	132.2	37 07.3	133.1	36 25.0	134.0	35 42.3	134.8	30
20	40 14.2	133.5	39 31.2	134.4	38 47.8	135.3	38 03.9	136.1	37 19.8	137.0	20
10	41 53.8	135.8	41 09.3	136.7	40 24.3	137.6	39 38.9	138.4	38 53.2	139.3	10
2 00	43 29.3	138.3	42 43.2	139.2	41 56.7	140.0	41 09.7	140.8	40 22.5	141.7	2 00
1 50	45 00.1	140.9	44 12.4	141.8	43 24.2	142.6	42 35.8	143.4	41 46.9	144.2	1 50
40	46 25.8	143.7	45 36.4	144.5	44 46.7	145.3	43 56.6	146.1	43 06.3	146.8	40
30	47 45.8	146.6	46 54.9	147.4	46 03.6	148.2	45 11.8	148.9	44 20.0	149.6	30
20	48 59.7	149.8	48 07.1	150.5	47 14.3	151.2	46 21.2	151.9	45 27.8	152.6	20
10	50 06.6	153.1	49 12.6	153.7	48 18.3	154.4	47 23.8	155.0	46 29.0	155.6	10
1 00	51 06.4	156.5	50 10.8	157.1	49 15.2	157.7	48 19.3	158.3	47 23.3	158.8	1 00
0 50	51 57.9	160.2	51 01.2	160.7	50 04.4	161.2	49 07.3	161.7	48 07.7	162.2	0 50
40	52 41.2	163.9	51 43.2	164.4	50 45.3	164.8	49 47.2	165.2	48 49.2	165.6	40
30	53 15.4	167.8	52 16.5	168.2	51 17.6	168.5	50 18.8	168.8	49 19.8	169.1	30
20	53 40.1	171.8	52 40.6	172.1	51 41.1	172.3	50 41.6	172.5	49 42.1	172.7	20
10	53 55.0	175.9	52 55.1	176.0	51 55.3	176.1	50 55.4	176.2	49 55.5	176.3	10
0 00	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 42.4	112.2	1 18.7	113.1	0 55.2	114.1	0 31.6	115.0	0 08.0	115.9	5 20
10	3 51.6	113.2	3 27.2	114.1	3 02.6	115.0	2 38.1	115.9	2 13.5	116.8	10
5 00	5 59.9	114.1	5 34.4	115.1	5 09.1	116.0	4 43.5	116.9	4 18.0	117.8	5 00
4 50	8 07.2	115.1	7 40.8	116.1	7 14.5	117.0	6 47.9	117.9	6 21.3	118.8	4 50
40	10 13.3	116.2	9 46.1	117.1	9 18.7	118.0	8 51.1	118.9	8 23.5	119.9	40
30	12 18.3	117.3	11 50.1	118.2	11 21.7	119.1	10 53.1	120.0	10 24.3	120.9	30
20	14 22.2	118.5	13 52.8	119.4	13 23.4	120.3	12 53.6	121.2	12 23.7	122.0	20
10	16 24.6	119.7	15 54.2	120.6	15 23.6	121.4	14 52.7	122.3	14 21.7	123.2	10
4 00	18 25.5	120.9	17 53.9	121.8	17 22.2	122.7	16 50.2	123.6	16 18.0	124.5	4 00
3 50	20 24.7	122.3	19 52.2	123.2	19 19.2	124.0	18 46.0	124.9	18 12.5	125.8	3 50
40	22 22.3	123.7	21 48.3	124.6	21 14.3	125.4	20 39.8	126.3	20 05.1	127.2	40
30	24 17.8	125.1	23 42.8	126.0	23 07.3	126.9	22 31.6	127.8	21 55.7	128.6	30
20	26 11.3	126.7	25 34.9	127.6	24 58.2	128.4	24 21.2	129.3	23 43.8	130.1	20
10	28 02.4	128.3	27 24.7	129.2	26 46.7	180.0	26 08.3	130.9	25 29.7	131.7	10
3 00	29 51.1	130.0	29 12.0	130.9	28 32.6	131.7	27 52.8	132.6	27 12.8	133.4	3 00
2 50	31 36.9	131.8	30 56.5	132.7	30 15.7	133.5	29 34.5	134.4	28 53.0	135.2	2 50
40	33 19.8	133.7	32 37.8	134.6	31 55.7	135.4	31 13.0	136.3	30 30.1	137.1	40
30	34 59.3	135.7	34 16.0	136.6	33 32.2	137.4	32 48.2	138.2	32 03.8	139.0	30
20	36 35.3	137.8	35 50.4	138.7	35 05.2	139.5	34 19.6	140.3	33 33.8	141.1	20
10	38 07.2	140.1	37 20.8	140.9	36 34.2	141.7	35 47.1	142.5	34 59.7	143.3	10
2 00	39 34.9	142.4	38 47.0	143.2	37 58.7	144.0	37 10.2	144.8	36 21.5	145.6	2 00
1 50	40 57.8	144.9	40 08.4	145.7	39 18.8	146.4	38 28.7	147.1	37 38.6	147.9	1 50
40	42 15.7	147.6	41 24.7	148.3	40 33.6	149.0	39 42.2	149.6	38 50.6	150.3	40
30	43 27.9	150.3	42 35.7	151.0	41 43.1	151.6	40 50.2	152.3	39 57.2	153.0	30
20	44 34.3	153.2	43 40.5	153.8	42 46.7	154.4	41 52.5	155.0	40 58.2	155.6	20
10	45 34.2	156.2	44 39.1	156.8	43 43.9	157.3	42 48.7	157.8	41 53.0	158.4	10
1 00	46 27.2	159.3	45 30.9	159.8	44 34.6	160.3	43 38.0	160.8	42 41.4	161.2	1 00
0 50	47 13.0	162.6	46 15.6	163.0	45 18.2	163.4	44 20.7	163.8	43 23.0	164.2	0 50
40	47 50.9	165.9	46 52.6	166.3	45 54.4	166.6	44 56.0	167.0	43 57.5	167.3	40
30	48 20.8	169.4	47 21.9	169.7	46 22.9	169.9	45 23.9	170.2	44 24.7	170.4	30
20	48 42.5	172.9	47 43.0	173.1	46 43.4	173.2	45 43.8	172.4	44 44.3	173.6	20
10	48 55.6	176.4	47 55.7	176.5	46 55.8	176.6	45 56.9	176.7	44 56.0	176.8	10
0 00	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 22.5	89.1	0 44.9	88.1	1 07.4	87.2	1 29.8	86.3	6 00
5 50	2 19.1	90.9	2 41.6	90.0	3 03.9	89.1	3 26.4	88.2	3 48.7	87.2	5 50
40	4 38.1	91.9	5 00.6	91.0	5 23.0	90.0	5 45.3	89.1	6 07.7	88.2	40
30	6 57.1	92.8	7 19.6	91.9	7 42.1	91.0	7 04.4	90.0	8 26.6	89.1	30
20	9 15.9	93.8	9 38.6	92.9	10 01.2	91.9	10 23.5	91.0	10 45.9	90.0	20
10	11 34.6	94.8	11 57.6	93.8	12 20.1	92.9	12 42.6	91.9	13 04.8	91.0	10
5 00	13 53.1	95.7	14 16.1	94.8	14 38.9	93.8	15 01.5	92.8	15 23.9	91.9	5 00
4 50	16 11.4	96.7	16 34.6	95.8	16 57.6	94.8	17 20.3	93.8	17 42.8	92.9	4 50
40	18 29.3	97.8	18 52.8	96.8	19 16.1	95.8	19 39.0	94.8	20 01.7	93.9	40
30	20 46.9	98.8	21 10.8	97.8	21 34.2	96.8	21 57.5	95.9	22 20.3	94.9	30
20	23 04.1	99.9	23 28.4	98.9	23 52.3	97.9	24 15.7	96.9	24 38.9	95.9	20
10	25 20.9	101.0	25 45.5	100.0	26 09.8	99.0	26 33.6	98.0	26 57.0	97.0	10
4 00	27 37.1	102.2	28 02.2	101.2	28 26.9	100.2	28 51.2	99.1	29 15.0	98.1	4 00
3 50	29 52.8	103.4	30 18.4	102.4	30 43.7	101.3	31 08.2	100.3	31 32.4	99.2	3 50
40	32 07.6	104.7	32 33.9	103.7	32 59.7	102.6	33 24.8	101.5	33 49.5	100.4	40
30	34 21.8	106.1	34 48.8	105.0	35 15.1	103.9	35 40.9	102.8	36 06.0	101.6	30
20	36 34.9	107.5	37 02.5	106.3	37 29.7	105.2	37 56.1	104.1	38 21.9	102.9	20
10	38 47.1	109.0	39 15.6	107.8	39 43.5	106.7	40 10.7	105.5	40 37.0	104.3	10
3 00	40 58.0	110.5	41 27.3	109.4	41 56.1	108.2	42 24.1	107.0	42 51.4	105.8	3 00
2 50	43 07.4	112.3	43 37.9	111.1	44 07.6	109.8	44 36.5	108.6	45 04.6	107.4	2 50
40	45 15.4	114.1	45 46.9	112.9	46 17.7	111.6	46 47.6	110.4	47 16.8	109.1	40
30	47 21.4	116.0	47 54.1	114.8	48 26.1	113.5	48 57.2	112.3	49 27.4	110.9	30
20	49 25.2	118.2	49 59.3	116.9	50 32.6	115.6	51 05.1	114.2	51 36.5	112.9	20
10	51 26.5	120.5	52 02.2	119.2	52 36.9	117.8	53 10.8	116.5	53 43.6	115.1	10
2 00	53 24.9	123.0	54 02.0	121.7	54 38.5	120.3	55 13.9	118.9	55 48.5	117.4	2 00
1 50	55 19.6	125.8	55 58.8	124.4	56 37.0	123.0	57 14.1	121.6	57 50.2	120.1	1 50
40	57 10.4	128.8	57 51.3	127.4	58 31.5	126.0	59 10.8	124.5	59 48.9	123.0	40
30	58 56.2	132.1	59 39.2	130.8	60 21.6	129.4	61 03.0	127.9	61 43.2	126.3	30
20	60 36.4	135.8	61 21.7	134.5	62 06.3	133.1	62 50.0	131.6	63 32.7	130.0	20
10	62 09.6	139.9	62 57.4	138.6	63 44.5	137.2	64 30.8	135.7	65 16.0	134.2	10
1 00	63 35.1	144.4	64 25.1	143.2	65 14.8	141.9	66 03.5	140.4	66 51.7	138.9	1 00
0 50	64 51.1	149.4	65 43.6	148.2	66 35.8	147.0	67 27.2	145.7	68 18.0	144.3	0 50
40	65 56.2	154.8	66 51.0	153.8	67 45.6	152.7	68 39.6	151.5	69 33.4	150.3	40
30	66 49.0	160.6	67 45.9	159.7	68 42.8	158.9	69 39.1	158.0	70 35.1	157.0	30
20	67 28.0	166.9	68 26.5	166.3	69 25.0	165.7	70 23.3	165.0	71 21.6	164.2	20
10	67 51.9	173.4	68 51.6	173.1	69 51.2	172.7	70 50.8	172.4	71 50.3	172.0	10
0 00	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10					0 18.9	82.6	0 41.4	81.7	1 04.1	80.7	6 10
6 00	1 52.3	85.4	2 14.6	84.4	2 37.0	83.5	2 59.3	82.6	3 21.6	81.7	6 00
5 50	4 11.0	86.3	4 33.2	85.4	4 55.3	84.4	5 17.3	83.5	5 39.3	82.6	5 50
40	6 29.8	87.2	6 51.8	86.3	7 13.9	85.4	7 35.7	84.4	7 57.4	83.5	40
30	8 48.8	88.1	9 10.9	87.2	9 32.5	86.3	9 54.1	85.3	10 15.6	84.4	30
20	11 07.8	89.1	11 29.7	88.1	11 51.4	87.2	12 12.9	86.2	12 34.2	85.3	20
10	13 26.9	90.0	13 48.8	89.0	14 10.4	88.1	14 31.7	87.1	14 52.9	86.2	10
5 00	15 45.9	90.9	16 07.7	90.0	16 29.3	89.0	16 50.7	88.0	17 11.7	87.0	5 00
4 50	18 04.9	91.9	18 26.9	90.9	18 48.4	89.9	19 09.7	88.9	19 30.6	87.9	4 50
40	20 23.9	92.9	20 45.9	91.9	21 07.6	90.9	21 28.8	89.9	21 49.7	88.9	40
30	22 42.8	93.9	23 04.9	92.9	23 26.5	91.8	23 47.8	90.8	24 08.6	89.8	30
20	25 01.4	94.9	25 23.6	93.9	25 45.5	92.8	26 06.9	91.8	26 27.8	90.7	20
10	27 19.9	95.9	27 42.3	94.9	28 04.3	93.8	28 25.8	92.8	28 46.8	91.7	10
4 00	29 38.1	97.0	30 00.8	95.9	30 23.1	94.9	30 44.7	93.8	31 05.8	92.7	4 00
3 50	31 55.9	98.1	32 19.0	97.0	32 41.4	95.9	33 03.4	94.8	33 24.7	93.7	3 50
40	34 13.4	99.3	34 36.8	98.1	34 59.8	97.0	35 21.9	95.9	35 43.4	94.7	40
30	36 30.5	100.5	36 54.3	99.3	37 17.5	98.2	37 40.1	97.0	38 01.8	95.8	30
20	38 46.9	101.8	39 11.2	100.6	39 35.1	99.4	39 57.8	98.2	40 20.1	97.0	20
10	41 02.8	103.1	41 27.6	101.9	41 51.6	100.7	42 15.4	99.5	42 37.9	98.2	10
3 00	43 17.7	104.6	43 43.3	103.3	44 08.3	102.1	44 32.2	100.8	44 55.4	99.5	3 00
2 50	45 31.8	106.1	45 58.3	104.8	46 23.8	103.5	46 48.6	102.2	47 12.3	100.8	2 50
40	47 44.9	107.8	48 12.2	106.4	48 38.8	105.1	49 04.1	103.7	49 28.5	102.3	40
30	49 56.6	109.5	50 25.0	108.2	50 52.3	106.8	51 18.7	105.3	51 43.9	103.9	30
20	52 07.0	111.5	52 36.4	110.1	53 05.0	108.6	53 32.3	107.1	53 58.5	105.6	20
10	54 15.4	113.6	54 46.2	112.2	55 15.9	110.6	55 44.5	109.1	56 11.6	107.5	10
2 00	56 21.7	115.9	56 53.9	114.4	57 25.3	112.8	57 55.1	111.2	58 23.8	109.5	2 00
1 50	58 25.4	118.6	58 59.2	117.0	59 32.1	115.3	60 03.7	113.6	60 33.7	111.9	1 50
40	60 25.9	121.4	61 01.7	119.8	61 36.5	118.1	62 09.8	116.3	62 41.8	114.5	40
30	62 22.5	124.7	63 00.4	123.0	63 37.1	121.3	64 12.7	119.4	64 46.7	117.5	30
20	64 14.3	128.4	64 54.5	126.7	65 34.0	124.9	66 11.8	123.0	66 48.2	121.0	20
10	66 00.1	132.6	66 43.1	130.8	67 25.0	129.0	68 05.7	127.0	68 44.8	125.0	10
1 00	67 38.5	137.3	68 24.4	135.6	69 09.5	133.8	69 53.2	131.8	70 35.6	129.7	1 00
0 50	69 08.0	142.7	69 57.0	141.1	70 45.2	139 3	71 32.4	137.4	72 18.0	135.3	0 50
40	70 26.2	148.9	71 18.2	147.4	72 09.9	145.7	73 00.5	144.0	73 50.3	142.0	40
30	71 30.8	155.8	72 26.2	154.5	73 20.8	153.1	74 15.0	151.6	75 08.0	149.8	30
20	72 19.5	163.4	73 17.1	162.5	74 14.8	161.4	75 11.8	160.3	76 08.5	158.9	20
10	72 49.8	171.6	73 49.1	171.1	74 48.4	170.5	75 47.7	169.9	76 46.8	169.1	10
0 00	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 19.0	76.1	0 42.0	75.2	6 20
10	1 26.7	79.8	1 49.2	78.9	2 11.8	78.0	2 34.2	77.0	2 56.7	76.1	10
6 00	3 43.8	80.7	4 05.9	79.8	4 28.0	78.9	4 50.0	77.9	5 12.0	77.0	6 00
5 50	6 01.1	81.6	6 22.9	80.7	6 44.7	79.8	7 06.1	78.8	7 27.7	77.9	5 50
40	8 18.9	82.5	8 40.4	81.6	9 01.7	80.6	9 22.9	79.7	9 43.9	78.7	40
30	10 36.9	83.4	10 58.0	82.5	11 19.0	81.5	11 39.9	80.6	12 00.4	79.6	30
20	12 55.2	84.3	13 16.1	83.3	13 36.9	82.4	13 57.3	81.4	14 17.5	80.4	20
10	15 13.7	85.2	15 34.4	84.2	15 54.8	83.2	16 14.9	82.2	16 34.7	81.2	10
5 00	17 32.4	86.1	17 52.9	85.1	18 13.0	84.1	18 32.8	83.1	18 52.4	82.1	5 00
4 50	19 51.2	87.0	20 11.4	86.0	20 31.4	85.0	20 51.0	83.9	21 10.1	82.9	4 50
40	22 10.2	87.9	22 30.3	86.8	22 50.1	85.8	23 09.5	84.8	23 28.4	83.8	40
30	24 29.2	88.8	24 49.2	87.7	25 08.8	86.7	25 28.0	85.6	25 46.8	84.6	30
20	26 48.2	89.7	27 08.2	88.6	27 27.7	87.6	27 46.8	86.5	28 05.3	85.4	20
10	29 07.3	90.6	29 27.3	89.5	29 46.8	88.5	30 05.6	87.4	30 23.9	86.3	10
4 00	31 26.4	91.6	31 46.3	90.5	32 05.9	89.4	32 24.6	88.2	32 42.9	87.1	4 00
3 50	33 45.3	92.6	34 05.4	91.4	34 24.8	90.3	34 43.6	89.1	35 01.6	88.0	3 50
40	36 04.2	93.6	36 24.4	92.4	36 43.9	91.2	37 02.7	90.1	37 20.9	88.9	40
30	38 22.9	94.7	38 43.3	93.5	39 02.9	92.2	39 21.7	91.0	39 39.8	89.8	30
20	40 41.4	95.8	41 02.1	94.5	41 21.9	93.3	41 40.8	92.0	41 59.0	90.7	20
10	42 59.6	96.9	43 20.5	95.6	43 40.3	94.4	43 59.8	93.1	44 17.9	91.7	10
3 00	45 17.6	98.2	45 38.8	96.8	45 59.2	95.5	46 18.6	94.1	46 37.0	92.7	3 00
2 50	47 34.9	99.4	47 56.7	98.1	48 17.4	96.7	48 37.1	95.3	48 55.7	93.8	2 50
40	49 51.9	100.9	50 14.1	99.4	50 35.5	98.0	50 55.5	96.5	51 14.5	95.0	40
30	52 08.1	102.4	52 31.0	100.9	52 53.0	99.3	53 13.5	97.8	53 32.9	96.2	30
20	54 23.6	104.0	54 47.3	102.5	55 09.9	100.8	55 31.2	99.2	55 51.0	97.5	20
10	56 37.9	105.8	57 02.6	104.2	57 26.0	102.5	57 48.0	100.7	58 08.5	99.0	10
2 00	58 51.0	107.8	59 16.9	106.1	59 41.3	104.3	60 04.3	102.4	60 25.7	100.6	2 00
1 50	61 02.4	110.1	61 29.7	108.2	61 55.6	106.3	62 19.5	104.4	62 41.9	102.4	1 50
40	63 12.1	112.6	63 40.9	110.6	64 08.2	108.6	64 33.7	106.5	64 57.4	104.4	40
30	65 19.1	115.5	65 49.8	113.4	66 18.8	111.3	66 46.4	109.0	67 11.2	106.7	30
20	67 22.9	118.9	67 55.7	116.7	68 27.2	114.4	68 56.4	112.0	69 23.7	109.5	20
10	69 22.2	122.8	69 58.0	120.5	70 32.0	118.0	71 03.7	115.4	71 33.2	112.7	10
1 00	71 16.2	127.5	71 55.0	125.0	72 32.2	122.5	73 07.1	119.7	73 39.9	116.8	1 00
0 50	73 02.3	133.1	73 45.0	130.6	74 25.7	127.9	75 04.5	124.9	75 41.0	121.9	0 50
40	74 38.6	139.8	75 25.2	137.3	76 10.6	134.7	76 53.9	131.7	77 34.9	128.4	40
30	76 00.4	147.9	76 51.7	145.6	77 42.0	143.2	78 30.5	140.3	79 17.0	137.1	30
20	77 04.8	157.4	78 00.2	155.6	78 55.2	153.7	79 49.0	151.3	80 41.6	148.5	20
10	77 45.8	168.3	78 44.6	167.3	79 43.2	166.2	80 41.4	164.8	80 39.3	163.0	10
0 00	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 02.2	70.5	0 25.8	69.9	6 30
20	1 05.0	74.2	1 27.9	73.3	1 50.9	72.4	2 13.8	71.5	2 36.7	70.5	20
10	3 19.1	75.2	3 31.4	74.2	4 03.7	73.3	4 25.9	72.4	4 48.1	71.4	10
6 00	5 33.8	76.1	5 55.6	75.1	6 17.3	74.2	6 38.9	73.2	7 00.3	72.3	6 00
5 50	7 49.1	76.9	8 10.3	76.0	8 31.4	75.0	8 52.2	74.1	9 13.1	73.1	5 50
40	10 04.7	77.8	10 25.5	76.8	10 45.9	75.9	11 06.3	74.9	11 26.4	73.9	40
30	12 20.8	78.6	12 41.2	77.7	13 01.0	76.7	13 20.8	75.7	13 40.3	74.7	30
20	14 37.4	79.5	14 57.2	78.5	15 16.6	77.5	15 35.9	76.5	15 58.4	75.5	20
10	16 54.3	80.3	17 13.7	79.3	17 32.7	78.3	17 51.2	77.3	18 09.7	76 3	10
5 00	19 11.6	81.1	19 30.5	80.1	19 49.0	79.1	20 07.2	78.1	20 25.0	77.0	5 00
4 50	21 29.0	81.9	21 47.6	80.9	22 05.7	79.9	22 23.4	78.8	22 40.7	77.8	4 50
40	23 47.0	82.7	24 05.1	81.7	24 22.7	80.6	24 40.0	79.6	24 56.8	78.5	40
30	26 04.9	83.5	26 22.8	82.5	26 40.1	81.4	26 56.9	80.3	27 13.2	79.2	30
20	28 23.3	84.3	28 40.8	83.2	28 57.8	82.1	29 14.2	81.0	29 30.1	79.9	20
10	30 41.8	85.1	30 58.9	84.0	31 15.6	82.9	31 31.6	81.8	31 47.1	80.6	10
4 00	33 00.4	86.0	33 17.5	84.8	33 33.7	83.7	33 49.5	82.5	34 04.6	81.3	4 00
3 50	35 19.1	86.8	35 36.0	85.6	35 52.1	84.4	36 07.5	83.2	36 22.1	82.0	3 50
40	37 38.1	87.7	37 54.8	86.5	38 10.6	85.2	38 25.7	84.0	38 40.0	82.7	40
30	39 57.1	88.5	40 13.6	87.3	40 29.2	86.0	40 44.1	84.7	40 58.1	83.4	30
20	42 16.2	89.4	42 32.7	88.1	42 48.0	86.8	43 02.7	85.5	43 16.3	84.1	20
10	44 35.2	90.4	44 51.6	89.0	45 07.1	87.6	45 21.4	86.3	45 34.7	84.9	10
3 00	46 54.3	91.3	47 10.8	89.9	47 25.9	88.5	47 40.3	87.1	47 53.4	85.6	3 00
2 50	49 13.2	92.3	49 29.7	90.9	49 45.0	89.4	49 59.1	87.9	50 12.1	86.3	2 50
40	51 32.3	93.4	51 48.9	91.9	52 04.1	90.3	52 18.2	88.7	52 30.9	87.1	40
30	53 51.0	94.6	54 07.8	93.0	54 23.1	91.3	54 37.2	89.6	54 49.9	87.9	30
20	56 09.5	95.9	56 26.6	94.1	56 42.1	92.4	56 56.3	90.6	57 08.9	88.8	20
10	58 27.6	97.2	58 45.0	95.3	59 01.1	93.5	59 15.4	91.6	59 27.9	89.7	10
2 00	60 45.4	88.7	61 03.6	96.7	61 19.8	94.7	61 34.3	92.7	61 47.0	90.6	2 00
1 50	63 02.5	100.3	63 21.5	98.2	63 38.4	96.0	63 53.2	93.7	64 06.2	91.6	1 50
40	65 19.0	102.2	65 38.8	99.9	65 56.3	97.6	66 11.8	95.2	66 25.1	92.8	40
30	67 34.2	104.3	67 55.4	101.8	68 14.0	99.3	68 30.2	96.7	68 43.7	94.0	30
20	69 48.4	106.9	70 10.9	104.1	70 30.7	101.3	70 48.1	98.4	71 02.6	95.5	20
10	72 00.5	109.9	72 24.8	106.9	72 46.7	103.8	73 05.2	100.5	73 20.5	97.2	10
1 00	74 09.8	113.6	74 36.9	110.3	75 00.6	106.8	75 21.4	103.1	75 38.3	99.3	1 00
0 50	76 14.8	118.5	76 45.0	114.7	77 12.5	110.8	77 35.7	106.5	77 55.0	102.1	0 50
40	78 13.2	124.8	78 48.6	120.7	79 20.1	116.2	79 47.5	111.2	80 09.8	106.0	40
30	80 01.5	133.3	80 42.5	129.0	81 21.0	124.0	81 54.0	118.3	82 21.5	111.8	30
20	81 32.6	145.1	82 21.7	140.9	83 07.7	135.8	83 49.7	129.5	84 26.2	121.7	20
10	82 36.6	160.9	83 33.1	158.1	84 28.4	154.4	85 21.7	149.1	86 11.7	141.6	10
0 00	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 18.2	64.1	6 40
30	0 49.5	68.7	1 13.0	67.8	1 36.6	66.9	2 00.1	66.0	2 23.7	65.1	30
20	2 59.5	69.6	3 22.3	68.7	3 45.0	67.8	4 07.7	66.8	4 30.2	65.9	20
10	5 10.2	70.5	5 32.1	69.6	5 54.1	68.6	6 15.8	67.7	6 37.7	66.8	10
6 00	7 21.7	71.4	7 42.9	70.4	8 04.0	69.5	8 25.0	68.5	8 45.8	67.6	6 00
5 50	9 33.7	72.2	9 54.2	71.2	10 14.6	70.3	10 34.7	69.3	10 54.8	68.4	5 50
40	11 46.4	73.0	12 06.3	72.0	12 25.8	71.1	12 45.2	70.1	13 04.4	69.1	40
30	13 59.7	73.8	14 18.7	72.8	14 37.6	71.8	14 56.2	70.8	15 14.6	69.8	30
20	16 13.5	74.5	16 32.0	73.5	16 50.0	72.5	17 07.9	71.5	17 25.5	70.6	20
10	18 27.8	75.3	18 45.5	74.3	19 03.0	73.3	19 20.1	72.2	19 36.9	71.3	10
5 00	20 42.5	76.0	20 59.7	75.0	21 16.4	74.0	21 32.8	72.9	21 48.8	71.9	5 00
4 50	22 57.7	76.7	23 14.2	75.7	23 30.3	74.7	23 45.9	73.6	24 01.3	72.5	4 50
40	25 13.2	77.4	25 29.2	76.4	25 44.7	75.3	25 59.6	74.2	26 14.2	73.2	40
30	27 29.2	78.1	27 44.5	77.1	27 59.3	76.0	28 13.6	74.8	28 27.5	73.8	30
20	29 45.4	78.8	30 00.3	77.7	30 14.4	76.6	30 28.1	75.4	30 41.2	74.4	20
10	32 02.0	79.5	32 16.2	78.3	32 29.8	77.2	32 42.8	76.0	32 55.3	74.9	10
4 00	34 18.9	80.2	34 32.7	79.0	34 45.7	77.8	34 58.0	76.6	35 09.7	75.4	4 00
3 50	36 36.2	80.8	36 49.2	79.6	37 01.7	78.4	37 13.4	77.1	37 24.3	75.9	3 50
40	38 53.5	81.5	39 06.3	80.2	39 18.1	79.0	39 29.3	77.7	39 39.5	76.4	40
30	41 11.2	82.2	41 23.4	80.8	41 34.7	79.5	41 45.2	78.2	41 54.7	76.9	30
20	43 29.1	82.8	43 40.9	81.4	43 51.6	80.1	44 01.5	78.7	44 10.4	77.4	20
10	45 47.2	83.5	45 58.5	82.1	46 08.7	80.7	46 18.0	79.2	46 26.2	77.8	10
3 00	48 05.4	84.1	48 16.4	82.7	48 26.1	81.2	48 34.7	79.7	48 42.2	78.2	3 00
2 50	50 23.8	84.8	50 34.2	83.3	50 43.6	81.7	50 51.7	80.1	50 58.4	78.6	2 50
40	52 42.4	85.5	52 52.6	83.9	53 01.3	82.2	53 08.8	80.6	53 14.9	79.0	40
30	55 01.1	86.2	55 10.9	84.5	55 19.2	82.7	55 26.1	81.0	55 31.4	79.3	30
20	57 20.0	86.9	57 29.5	85.1	57 37.2	83.2	57 43.5	81.4	57 48.2	79.6	20
10	59 38.7	87.7	59 48.0	85.8	59 55.5	83.8	60 01.0	81.8	60 04.9	79.8	10
2 00	61 57.8	88.5	62 06.7	86.4	62 13.7	84.3	62 18.7	82.1	62 21.9	80.0	2 00
1 50	64 16.9	89.3	64 25.6	87.1	64 32.2	84.8	64 36.5	82.4	64 39.0	80.1	1 50
40	66 36.0	90.3	66 44.6	87.8	66 50.8	85.3	66 54.6	82.7	66 55.9	80.2	40
30	68 55.2	91.3	69 03.5	88.5	69 09.5	85.7	69 12.5	82.9	69 13.0	80.1	30
20	71 14.0	92.4	71 22.8	89.3	71 28.0	86.2	71 30.6	83.1	71 29.9	80.0	20
10	73 33.2	93.8	73 41.5	90.3	73 47.0	86.7	73 48.5	83.1	73 46.7	79.5	10
1 00	75 51.4	95.4	76 00.9	91.3	76 05.6	87.2	76 06.7	83.0	76 03.3	78.9	1 00
0 50	78 10.0	97.4	78 19.5	92.6	78 24.7	87.7	78 24.7	82.7	78 19.5	77.8	0 50
40	80 27.3	100.3	80 38.6	94.3	80 43.8	88.1	80 42.5	81.8	80 35.0	75.9	40
30	82 43.0	104.6	82 57.0	96.8	83 03.0	88.6	83 00.0	80.3	82 48.5	72.4	30
20	84 55.3	112.3	85 14.5	101.2	85 21.8	89.1	85 16.4	76.8	84 58.9	65.5	20
10	86 55.6	130.1	87 28.2	112.8	87 41.0	89.5	87 29.0	66.1	86 57.1	48.6	10
0 00	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	88 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 19.1	90.9	1 56.6	91.9	1 33.9	92.8	1 11.4	93.7	0 48.9	94.7	5 50
40	4 38.1	91.9	4 15.5	92.8	3 52.9	93.7	3 30.1	94.7	3 07.4	95.6	40
30	6 57.1	92.8	6 34.2	93.7	6 11.4	94.7	5 48.6	95.6	5 25.6	96.5	30
20	9 15.9	93.8	8 53.0	94.7	8 30.1	95.7	8 06.9	96.6	7 48.3	97.5	20
10	11 34.6	94.8	11 11.5	95.7	10 48.2	96.6	10 25.0	97.6	10 01.4	98.5	10
5 00	13 53.1	95.7	13 29.8	96.7	13.06.4	97.6	12 42.7	98.6	12 18.8	99.5	5 00
4 50	16 11.4	96.7	15 47.6	97.7	15 23.9	98.6	14 59.9	99.6	14 35.7	100.5	4 50
40	18 29.3	97.8	18 05.4	98.8	17 41.3	99.7	17 16.9	100.7	16 52.3	101.6	40
30	20 46.9	98.8	20 22.7	99.8	19 58.1	100.8	19 33.3	101.8	19 08.2	102.7	30
20	23 04.1	99.9	22 39.5	100.9	22 14.6	101.9	21 49.2	102.9	21 23.6	103.8	20
10	25 20.9	101.0	24 55.8	102.0	24 30.3	103.0	24 04.4	104.0	23 38.3	105.0	10
4 00	27 37.1	102.2	27 11.5	103.2	26 45.5	104.2	26 19.1	105.2	25 52.2	106.2	4 00
3 50	29 52.8	103.4	29 26.6	104.5	29 00.0	105.5	28 32.8	106.5	28 05.3	107.5	3 50
40	32 07.6	104.7	31 40.8	105.8	31 13.5	106.8	30 45.7	107.8	30 17.4	108.9	40
30	34 21.8	106.1	33 54.3	107.2	33 26.2	108.2	32 57.6	109.2	32 28.5	110.3	30
20	36 34.9	107.5	36 06.5	108.6	35 37.8	109.6	35 08.3	110.7	34 38.3	111.8	20
10	38 47.1	109.0	38 17.9	110.1	37 48.3	111.2	37 17.8	112.3	36 46.8	113.3	10
3 00	40 58.0	110.5	40 27.8	111.7	39 57.2	112.8	39 25.7	113.9	38 53.7	115.0	3 00
2 50	43 07.4	112.3	42 36.3	113.4	42 04.4	114.5	41 31.9	115.7	40 58.8	116.8	2 50
40	45 15.4	114.1	44 43.0	115.3	44 10.1	116.4	43 36.3	117.6	43 01.9	118.7	40
30	47 21.4	116.0	46 47.8	117.2	46 13.4	118.4	45 38.4	119.6	45 02.7	120.7	30
20	49 25.2	118.2	48 50.2	119.4	48 14.5	120.6	47 38.1	121.8	47 00.8	123.0	20
10	51 26.5	120.5	50 50.0	121.8	50 12.8	123.0	49 34.6	124.2	48 56.0	125.4	10
2 00	53 24.9	123.0	52 46.6	124.3	52 07.8	125.5	51 28.0	126.7	50 47.7	127.9	2 00
1 50	55 19.6	125.8	54 39.8	127.1	53 59.0	128.3	53 17.5	129.5	52 35.2	130.7	1 50
40	57 10.4	128.8	56 28.4	130.1	55 45.9	131.4	55 02.4	132.6	54 18.4	133.7	40
30	58 56.2	132.1	58 12.1	133.4	57 27.5	134.7	56 42.1	135.9	55 56.0	137.1	30
20	60 36.4	135.8	59 50.1	137.1	59 03.3	138.3	58 15.8	139.5	57 27.5	140.6	20
10	62 09.6	139.9	61 21.1	141.1	60 32.0	142.3	59 42.4	143.4	58 52.2	144.5	10
1 00	63 35.1	134.4	62 44.1	145.6	61 52.9	146.7	61 00.9	147.8	60 08.7	148.8	1 00
0 50	64 51.1	149.4	63 57.9	150.5	63 04.2	151.5	62 10.4	152.4	61 16.1	153.3	0 50
40	65 56.2	154.8	65 00.8	155.7	64 05.3	156.6	63 09.3	157.4	62 13.2	158.2	40
30	66 49.0	160.6	65 51.8	161.4	64 54.4	162.1	63 56.8	162.8	62 59.0	163.4	30
20	67 28.0	166.9	66 29.2	167.4	65 30.5	167.9	64 31.6	168.4	63 32.7	168.8	20
10	67 51.9	173.4	66 52.2	173.7	65 52.6	173.9	64 52.9	174.1	63 53.1	174.3	10
0 00	68 0.0	180.0	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 26.2	95.6	0 03.5	96.5							5 50
40	2 44.6	96.5	2 21.7	97.4	1 58.9	98.4	1 35.9	99.3	1 13.0	100.2	40
30	5 02.6	97.5	4 39.7	98.4	4 16.2	99.3	3 52.9	100.2	3 29.6	101.2	30
20	7 20.3	98.5	6 56.9	99.4	6 33.3	100.3	6 09.6	101.2	5 45.8	102.2	20
10	9 37.7	99.5	9 13.9	100.4	8 49.9	101.3	8 25.7	102.2	8 01.6	103.2	10
5 00	11 54.7	100.5	11 30.4	101.4	11 06.1	102.3	10 41.5	103.3	10 16.7	104.2	5 00
4 50	14 11.2	101.5	13 46.6	102.4	13 21.6	103.3	12 56.5	104.3	12 31.1	105.2	4 50
40	16 27.3	102.6	16 02.1	103.5	15 36.7	104.4	15 11.0	105.4	14 45.1	106.3	40
30	18 42.8	103.7	17 17.0	104.6	17 50.9	105.5	17 24.6	106.5	16 58.0	107.4	30
20	20 57.6	104.8	20 31.1	105.8	20 04.6	106.7	19 37.6	107.7	19 10.5	108.6	20
10	23 11.6	106.0	22 44.6	107.0	22 17.4	107.9	21 49.6	108.9	21 21.6	109.8	10
4 00	25 24.9	107.2	24 57.2	108.2	24 29.2	109.2	24 00.8	110.2	23 32.0	111.1	4 00
3 50	27 37.2	108.5	27 08.8	109.5	26 40.0	110.5	26 10.8	111.5	25 41.2	112.4	3 50
40	29 48.6	109.9	29 19.4	110.9	28 49.8	111.9	28 19.6	112.9	27 49.1	113.8	40
30	31 58.8	111.3	31 28.8	112.3	30 58.1	113.3	30 27.1	114.3	29 55.6	115.3	30
20	34 07.8	112.8	33 36.7	113.8	33 05.2	114.9	32 33.0	115.9	32 00.4	116.8	20
10	36 15.2	114.4	35 43.1	115.4	35 10.3	116.5	34 37.4	117.5	34 03.7	118.5	10
3 00	38 21.0	116.1	37 47.8	117.2	37 14.1	118.2	36 39.8	119.2	36 04.9	120.2	3 00
2 50	40 24.9	117.9	39 50.6	119.0	39 15.6	120.0	38 40.1	121.0	38 04.0	122.1	2 50
40	42 26.8	119.8	41 51.1	120.9	41 14.9	122.0	40 38.1	123.0	40 00.6	124.0	40
30	44 26.2	121.9	43 49.1	123.0	43 11.5	124.1	42 33.2	125.1	41 54.4	126.1	30
20	46 23.0	124.1	45 44.4	125.2	45 05.3	126.3	44 25.5	127.3	43 45.2	128.4	20
10	48 16.5	126.5	47 36.4	127.6	46 55.7	128.7	46 14.3	129.7	45 32.3	130.8	10
2 00	50 06.5	129.1	49 24.6	130.2	48 42.4	131.3	47 59.4	132.3	47 15.9	133.3	2 00
1 50	51 52.4	131.8	51 08.8	132.9	50 24.7	134.0	49 39.9	135.1	48 54.6	136.1	1 50
40	53 33.6	134.9	52 48.1	136.0	52 02.2	137.0	51 15.7	138.0	50 28.6	139.0	40
30	55 09.2	138.2	54 21.9	139.2	53 34.1	140.2	52 45.7	141.2	51 56.9	142.2	30
20	56 38.9	141.7	55 49.5	142.7	54 59.9	143.7	54 09.6	144.7	53 19.1	145.6	20
10	58 01.4	145.6	57 10.0	146.5	56 18.4	147.5	55 26.3	148.4	54 32.9	149.2	10
1 00	59 15.9	149.7	58 22.6	150.6	57 29.3	151.5	56 35.3	152.3	55 41.3	153.1	1 00
0 50	60 21.4	154.2	59 26.2	155.0	58 31.0	155.7	57 35.6	156.4	56 39.9	157.1	0 50
40	61 16.8	158.9	60 20.0	159.6	59 23.4	160.2	58 26.3	160.8	57 29.3	161.4	40
30	62 01.1	164.0	61 03.1	164.5	60 05.0	164.9	59 06.7	165.4	58 08.3	165.9	30
20	62 33.6	169.2	61 34.5	169.5	60 35.4	169.8	59 36.2	170.2	58 36.9	170.5	20
10	62 53.3	174.5	61 53.6	174.7	60 53.8	174.9	59 54.0	175.1	58 54.2	175.2	10
0 00	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 49.9	101.1	0 27.0	102.1	0 04.0	103.0					5 40
30	3 06.1	102.1	2 42.7	103.0	2 19.2	103.9	1 55.7	104.9	1 32.1	105.8	30
20	5 21.9	103.1	4 57.9	104.0	4 34.0	104.9	4 09.8	105.9	3 45.7	106.8	20
10	7 37.1	104.1	7 12.6	105.0	6 48.1	105.9	6 23.3	106.9	5 58.5	107.8	10
5 00	9 51.8	105.1	9 26.7	106.0	9 01.4	106.9	8 36.0	107.9	8 10.6	108.8	5 00
4 50	12 05.6	106.1	11 39.9	107.1	11 14.1	108.0	10 48.1	108.9	10 21.8	109.8	4 50
40	14 18.9	107.3	13 52.5	108.2	13 26.0	109.1	12 59.2	110.0	12 32.3	110.9	40
30	16 31.2	108.4	16 04.2	109.3	15 36.9	110.2	15 09.4	111.1	14 41.7	112.1	30
20	18 42.8	109.6	18 15.0	110.5	17 46.9	111.4	17 18.6	112.3	16 50.0	113.3	20
10	20 53.4	110.8	20 24.8	111.7	19 55.9	112.7	19 26.6	113.6	18 57.1	114.5	10
4 00	23 02.9	112.1	22 33.3	113.0	22 03.6	113.9	21 33.5	114.9	21 03.1	115.8	4 00
3 50	25 11.1	113.4	24 40.8	114.3	24 10.0	115.3	23 39.0	116.3	23 07.4	117.2	3 50
40	27 18.1	114.8	26 46.7	115.7	26 15.1	116.7	25 43.0	117.6	25 10.5	118.6	40
30	29 23.6	116.3	28 51.3	117.2	28 18.6	118.2	27 45.3	119.1	27 11.7	120.1	30
20	31 27.5	117.8	30 54.0	118.8	30 20.2	119.8	29 45.9	120.7	29 11.2	121.6	20
10	33 29.5	119.5	32 55.0	120.4	32 19.7	121.4	31 44.5	122.3	31 08.5	123.3	10
3 00	35 29.6	121.2	34 53.8	122.2	34 17.5	123.2	33 40.8	124.1	33 03.6	125.1	3 00
2 50	37 27.4	123.1	36 50.4	124.1	36 12.7	125.0	35 34.7	125.9	34 56.1	126.9	2 50
40	39 22.7	125.0	38 44.1	126.0	38 05.3	127.0	37 25.8	127.9	36 45.9	128.9	40
30	41 15.1	127.1	40 35.2	128.1	39 54.8	129.1	39 14.0	130.0	38 32.7	131.0	30
20	43 04.4	129.4	42 22.9	130.4	41 41.1	131.3	40 58.8	132.2	40 15.9	133.2	20
10	44 50.0	131.8	44 07.1	132.8	43 23.6	133.7	42 39.7	134.6	41 55.3	135.5	10
2 00	46 31.7	134.3	45 47.1	135.3	45 02.1	136.2	44 16.6	137.1	43 30.6	138.0	2 00
1 50	48 08.8	137.0	47 22.7	138.0	46 36.0	138.9	45 48.8	139.8	45 01.2	140.7	1 50
40	49 41.1	140.0	48 53.0	140.9	48 04.8	141.8	47 16.0	142.7	46 26.8	143.5	40
30	51 07.7	143.1	50 18.0	144.0	49 27.9	144.8	48 37.5	145.7	47 46.7	146.5	30
20	52 28.0	146.5	51 36.4	147.3	50 44.8	148.1	49 52.6	148.9	49 00.4	149.6	20
10	53 41.1	150.0	52 48.2	150.8	51 54.8	151.5	51 01.1	152.2	50 07.1	152.9	10
1 00	54 46.8	153.8	53 52.0	154.5	52 57.2	155.2	52 02.0	155.8	51 06.7	156.4	1 00
0 50	55 43.9	157.8	54 47.8	158.4	53 51.4	159.0	52 54.9	159.5	51 58.2	160.1	0 50
40	56 31.9	161.9	55 34.4	162.5	54 36.8	163.0	53 39.1	163.4	52 41.3	163.9	40
30	57 09.8	166.3	56 11.4	166.7	55 12.8	167.1	54 14.2	167.4	53 15.4	167.8	30
20	57 37.6	170.8	56 38.2	171.1	55 38.9	171.3	54 39.5	171.6	53 40.1	171.8	20
10	57 54.4	175.3	56 54.6	175.5	55 54.7	175.6	54 54.9	175.8	53 55.0	175.9	10
0 00	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 08.6	106.7	0 45.1	107.6	0 21.2	108.6					5 30
20	3 21.4	107.7	2 57.2	108.6	2 32.8	109.5	2 08.5	110.4	1 44.1	111.3	20
10	5 33.6	108.7	5 08.7	109.6	4 43.5	110.5	4 18.3	111.4	3 53.2	112.3	10
5 00	7 44.9	109.7	7 19.3	110.6	6 53.4	111.5	6 27.5	112.4	6 01.4	113.3	5 00
4 50	9 55.4	110.8	9 29.0	111.7	9 02.2	112.6	8 35.5	113.5	8 08.6	114.4	4 50
40	12 05.1	111.9	11 37.8	112.8	11 10.2	113.7	10 42.6	114.6	10 14.7	115.5	40
30	14 13.6	113.0	13 45.5	113.9	13 17.0	114.8	12 48.4	115.7	12 19.7	116.6	30
20	16 21.1	114.2	15 52.0	115.1	15 22.7	116.0	14 53.2	116.9	14 23.4	117.8	20
10	18 27.4	115.4	17 57.4	116.3	17 26.9	117.2	16 56.4	118.1	16 25.7	119.0	10
4 00	20 32.3	116.7	20 01.4	117.6	19 30.0	118.5	18 58.5	119.4	18 26.6	120.3	4 00
3 50	22 35.8	118.1	22 03.7	119.0	21 31.3	119.9	20 58.7	120.8	20 25.7	121.7	3 50
40	24 37.7	119.5	24 04.6	120.4	23 31.1	121.3	22 57.3	122.2	22 23.3	123.1	40
30	26 37.9	121.0	26 03.6	121.9	25 28.9	122.8	24 54.0	123.7	24 18.7	124.6	30
20	28 36.1	122.6	28 00.7	123.5	27 24.8	124.4	26 48.7	125.3	26 12.1	126.2	20
10	30 32.2	124.3	29 55.7	125.2	29 18.5	126.1	28 41.1	126.9	28 03.2	127.8	10
3 00	32 26.0	126.0	31 48.1	126.9	31 09.7	127.8	30 30.9	128.7	29 51.8	129.6	3 00
2 50	34 17.2	127.8	33 37.9	128.7	32 58.1	129.6	32 18.0	130.5	31 37.6	131.4	2 50
40	36 05.6	129.8	35 24.9	130.7	34 43.8	131.6	34 02.3	132.5	33 20.4	133.3	40
30	37 50.9	131.9	37 08.7	132.8	36 26.1	133.7	35 43.2	134.5	34 59.8	135.3	30
20	39 32.7	134.1	38 40.9	135.0	38 04.9	135.9	37 20.5	136.7	36 35.7	137.5	20
10	41 10.6	136.4	40 25.3	137.3	39 39.8	138.2	38 53.9	139.0	38 07.6	139.8	10
2 00	42 44.3	138.9	41 57.6	139.8	41 10.5	140.6	40 23.1	141.4	39 35.2	142.2	2 00
1 50	44 13.3	141.5	43 25.1	142.4	42 36.4	143.2	41 47.4	143.9	40 58.2	144.7	1 50
40	45 37.2	144.3	44 47.4	145.1	43 57.2	145.9	43 06.7	146.6	42 15.9	147.3	40
30	46 55.5	147.2	46 04.1	148.8	45 12.3	148.8	44 20.4	149.5	43 28.1	150.1	30
20	48 07.6	150.3	47 14.7	151.0	46 21.5	151.7	45 28.1	152.4	44 34.5	153.0	20
10	49 13.1	153.6	48 18.6	154.2	47 24.0	154.8	46 29.3	155.4	45 34.2	156.0	10
1 00	50 11.2	157.0	49 15.4	157.6	48 19.5	158.1	47 23.5	158.7	46 27.3	159.2	1 00
0 50	51 01.5	160.6	50 04.5	161.1	49 07.4	161.5	48 10.2	162.0	47 13.0	162.5	0 50
40	51 43.4	164.3	50 45.5	164.7	49 47.3	165.1	48 49.2	165.5	47 50.9	165.9	40
30	52 16.6	168.1	51 17.7	168.4	50 18.9	168.7	49 19.9	169.0	48 20.9	169.3	30
20	52 40.6	172.0	51 41.2	172.2	50 41.6	172.4	49 42.1	172.6	48 42.5	172.8	20
10	52 55.2	176.0	51 55.3	176.1	50 55.4	176.2	49 55.5	176.3	48 55.7	176.4	10
0 00	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 19.6	112.2	0 55.2	113.2	0 30.7	114.1	0 06.3	115.0			5 20
10	3 27.9	113.2	3 02.6	114.1	2 37.3	115.0	2 11.8	115.9	1 46.4	116.8	10
5 00	5 35.2	114.2	5 09.1	115.1	4 42.8	116.0	4 16.5	116.9	3 50.0	117.8	5 00
4 50	7 41.6	115.3	7 14.5	116.2	6 47.2	117.1	6 19.8	118.0	5 52.4	118.9	4 50
40	9 46.8	116.4	9 18.7	117.3	8 50.5	118.2	8 22.1	119.1	7 53.6	120.0	40
30	11 50.7	117.5	11 21.7	118.4	10 52.4	119.3	10 22.9	120.2	9 53.5	121.1	30
20	13 53.4	118.7	13 23.4	119.6	12 53.0	120.5	12 22.5	121.4	11 51.9	122.3	20
10	15 54.7	119.9	15 23.6	120.8	14 52.1	121.7	14 20.5	122.6	13 48.8	123.4	10
4 00	17 54.5	121.2	17 22.2	122.1	16 49.7	123.0	16 16.9	123.9	15 44.0	124.7	4 00
3 50	19 52.6	122.6	19 19.2	123.5	18 45.4	124.3	18 11.4	125.2	17 37.2	126.0	3 50
40	21 48.9	124.0	21 14.3	124.9	20 39.3	125.8	20 04.2	126.6	19 28.8	127.5	40
30	23 43.2	125.5	23 07.3	126.3	22 31.2	127.2	21 54.7	128.0	21 18.0	128.9	30
20	25 35.3	127.1	24 58.2	127.9	24 20.8	128.8	23 43.1	129.6	23 05.1	130.5	20
10	27 25.1	128.7	26 46.7	129.5	26 07.9	130.4	25 28.9	131.2	24 49.6	132.1	10
3 00	29 12.3	130.5	28 32.6	131.3	27 52.5	132.1	27 12.1	132.9	26 31.5	133.8	3 00
2 50	30 56.7	132.3	30 15.7	133.1	29 34.2	134.0	28 52.4	134.8	28 10.3	135.6	2 50
40	32 38.1	134.2	31 55.7	135.0	31 12.7	135.8	30 29.6	136.6	29 46.1	137.5	40
30	34 16.2	136.2	33 32.2	137.0	32 48.0	137.8	32 03.3	138.6	31 18.4	139.4	30
20	35 50.6	138.3	35 05.2	139.1	34 19.4	139.9	33 33.4	140.7	32 47.1	141.5	20
10	37 21.0	140.6	36 34.2	141.4	35 47.0	142.1	34 59.4	142.9	34 11.7	143.6	10
2 00	38 47.1	142.9	37 58.7	143.7	37 10.1	144.4	36 21.1	145.2	35 32.1	145.9	2 00
1 50	40 08.5	145.4	39 18.8	146.2	38 28.6	146.9	37 38.2	147.6	36 47.7	148.3	1 50
40	41 24.8	148.0	40 33.6	148.7	39 42.1	149.4	38 50.4	150.1	37 58.5	150.8	40
30	42 35.7	150.8	41 43.1	151.4	40 50.2	152.0	39 57.1	152.6	39 03.8	153.3	30
20	43 40.6	153.6	42 46.7	154.2	41 52.4	154.8	40 58.1	155.3	40 03.6	155.9	20
10	44 39.2	156.5	43 43.9	157.1	42 48.6	157.7	41 52.9	158.2	40 57.2	158.7	10
1 00	45 30.9	159.7	44 34.6	160.2	43 37.9	160.7	42 41.4	161.1	41 44.6	161.6	1 00
0 50	46 15.6	162.9	45 18.2	163.3	44 20.6	163.7	43 23.0	164.1	42 25.2	164.5	0 50
40	46 52.7	166.2	45 54.4	166.5	44 55.9	166.9	43 57.5	167.2	42 59.1	167.5	40
30	47 21.9	169.6	46 22.9	169.8	45 23.9	170.1	44 24.7	170.3	43 25.5	170.6	30
20	47 43.0	173.0	46 43.4	173.2	45 43.8	173.4	44 44.3	173.5	43 44.7	173.7	20
10	47 55.8	176.5	46 55.9	176.6	45 56.0	176.7	44 56.1	176.8	43 56.1	176.9	10
0 00	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 23.4	89.1	0 46.8	88.2	1 10.3	87.2	1 33.7	86.3	6 00
5 50	2 18.1	91.0	2 41.5	90.1	3 04.8	89.1	3 28.3	88.2	3 51.6	87.3	5 50
40	4 36.1	92.0	4 59.5	91.0	5 22.9	90.1	5 46.3	89.2	6 09.5	88.3	40
30	6 54.0	92.9	7 17.6	92.0	7 41.0	91.1	8 04.4	90.2	8 27.5	89.2	30
20	9 11.9	93.9	9 35.5	93.0	9 59.0	92.1	10 22.5	91.1	10 45.6	90.2	20
10	11 29.5	95.0	11 53.3	94.0	12 17.0	93.1	12 40.5	92.1	13 03.7	91.2	10
5 00	13 47.0	96.0	14 11.0	95.0	14 34.8	94.1	14 58.4	93.1	15 21.7	92.2	5 00
4 50	16 04.2	97.0	16 28.4	96.1	16 52.4	95.2	17 16.2	94.2	17 39.7	93.2	4 50
40	18 21.0	98.1	18 45.5	97.1	19 09.8	96.2	19 33.8	95.2	19 57.4	94.2	40
30	20 37.6	99.2	21 02.4	98.2	21 26.9	97.3	21 51.2	96.3	22 15.1	95.3	30
20	22 53.6	100.3	23 18.8	99.3	23 43.7	98.4	24 08.3	97.4	24 32.4	96.3	20
10	25 09.2	101.5	25 34.9	100.5	26 00.1	99.5	26 25.0	98.5	26 49.4	97.5	10
4 00	27 24.2	102.7	27 50.3	101.7	28 16.1	100.7	28 41.4	99.6	29 06.2	98.6	4 00
3 50	29 38.6	104.0	30 05.3	102.9	30 31.5	101.9	30 57.2	100.8	31 22.5	99.8	3 50
40	31 52.1	105.3	32 19.4	104.2	32 46.3	103.2	33 12.6	102.1	33 38.3	101.0	40
30	34 04.9	106.7	34 32.9	105.6	35 00.3	104.6	35 27.2	103.4	35 53.5	102.3	30
20	36 16.6	108.2	36 45.3	107.1	37 13.5	106.0	37 41.2	104.8	38 08.1	103.7	20
10	38 27.2	109.7	38 56.8	108.6	39 25.8	107.5	39 54.2	106.3	40 21.8	105.2	10
3 00	40 36.5	111.4	41 07.0	110.2	41 36.9	109.1	42 06.1	107.9	42 34.5	106.7	3 00
2 50	42 44.3	113.1	43 15.9	111.9	43 46.8	110.8	44 17.0	109.6	44 46.2	108.3	2 50
40	44 50.5	115.0	45 23.1	113.8	45 55.0	112.6	46 26.2	111.4	46 56.6	110.1	40
30	46 54.6	117.0	47 28.5	115.8	48 01.8	114.5	48 34.1	113.3	49 05.5	112.1	30
20	48 56.5	119.2	49 31.7	117.9	50 06.1	116.7	50 39.8	115.4	51 12.7	114.1	20
10	50 55.6	121.5	51 32.4	120.3	52 08.3	119.0	52 43.5	117.6	53 17.6	116.3	10
2 00	52 51.7	124.1	53 30.1	122.8	54 07.6	121.5	54 44.4	120.1	55 20.2	118.7	2 00
1 50	54 44.0	126.9	55 24.2	125.6	56 03.8	124.3	56 42.2	122.9	57 19.6	121.5	1 50
40	56 32.3	130.0	57 14.3	128.7	57 55.6	127.3	58 36.1	125.9	59 15.6	124.5	40
30	58 15.4	133.3	58 59.8	132.0	59 43.1	130.7	60 25.5	129.3	61 07.1	127.8	30
20	59 52.9	137.0	60 39.2	135.7	61 24.8	134.4	62 09.6	133.0	62 53.5	131.5	20
10	61 23.2	141.1	62 12.0	139.9	63 00.0	138.6	63 47.1	137.2	64 33.5	135.7	10
1 00	62 45.8	145.6	63 36.7	144.4	64 27.0	143.1	65 16.9	141.8	66 05.9	140.4	1 00
0 50	63 59.1	150.5	64 52.2	149.4	65 45.1	148.2	66 37.2	147.0	67 29.0	145.7	0 50
40	65 01.7	155.7	65 56.9	154.8	66 52.0	153.8	67 46.7	152.7	68 40.9	151.6	40
30	65 52.3	161.4	66 49.6	160.6	67 46.6	159.8	68 43.5	159.0	69 40.0	158.0	30
20	66 29.5	167.4	67 28.0	166.9	68 26.7	166.3	69 25.4	165.7	70 23.7	165.0	20
10	66 52.3	173.6	67 52.0	173.4	68 51.7	173.1	69 51.3	172.7	70 50.9	172.4	10
0 00	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 03.2	83.5	0 26.7	82.6	0 50.3	81.7	1 13.9	80.8	6 10
6 00	1 57.1	85.4	2 20.4	84.5	2 43.7	83.6	3 07.1	82.6	3 30.3	81.7	6 00
5 50	4 14.8	86.4	4 37.9	85.5	5 01.1	84.5	5 24.1	83.6	5 47.1	82.7	5 50
40	6 32.7	87.3	6 55.7	86.4	7 18.6	85.5	7 41.5	84.5	8 04.2	83.6	40
30	8 50.6	88.3	9 13.5	87.4	9 36.3	86.4	9 59.0	85.5	10 21.4	84.6	30
20	11 08.8	89.3	11 31.6	88.3	11 54.2	87.4	12 16.7	86.4	12 39.1	85.5	20
10	13 26.8	90.2	13 49.7	89.3	14 12.2	88.3	14 34.5	87.4	14 56.8	86.4	10
5 00	15 44.9	91.2	16 07.7	90.3	16 30.2	89.3	16 52.6	88.3	17 14.7	87.4	5 00
4 50	18 02.8	92.2	18 25.7	91.3	18 48.3	90.3	19 10.6	89.3	19 32.6	88.3	4 50
40	20 20.8	93.2	20 43.7	92.3	21 06.3	91.3	21 28.7	90.3	21 50.7	89.3	40
30	22 38.6	94.3	23 01.6	93.3	23 24.4	92.3	23 46.7	91.3	24 08.8	90.2	30
20	24 56.2	95.3	25 19.4	94.3	25 42.2	93.3	26 04.8	92.3	26 26.9	91.2	20
10	27 13.5	96.4	27 36.9	95.4	28 00.0	94.3	28 22.7	93.3	28 44.8	92.2	10
4 00	29 30.5	97.6	29 54.4	96.5	30 17.6	95.4	30 40.5	94.4	31 02.8	93.3	4 00
3 50	31 47.2	98.7	32 11.3	97.7	32 35.0	96.6	32 57.9	95.5	33 20.5	94.3	3 50
40	34 03.5	100.0	34 28.0	98.8	34 51.9	97.7	35 15.4	96.6	35 38.1	95.5	40
30	36 19.2	101.2	36 44.2	100.1	37 08.5	98.9	37 32.3	97.8	37 55.4	96.6	30
20	38 34.3	102.6	38 59.9	101.4	39 24.6	100.2	39 48.9	99.0	40 12.3	97.8	20
10	40 48.8	104.0	41 14.9	102.8	41 40.3	101.6	42 04.9	100.3	42 28.5	99.1	10
3 00	43 02.2	105.5	43 29.1	104.2	43 55.1	103.0	44 20.6	101.7	44 45.0	100.5	3 00
2 50	45 14.8	107.1	45 42.4	105.8	46 09.3	104.5	46 35.2	103.2	47 00.4	101.9	2 50
40	47 26.2	108.8	47 54.8	107.5	48 22.4	106.2	48 49.3	104.8	49 15.2	103.4	40
30	49 36.2	110.7	50 05.8	109.3	50 34.6	107.9	51 02.1	106.5	51 29.0	105.1	30
20	51 44.5	112.7	52 15.3	111.3	52 45.0	109.9	53 14.0	108.4	53 41.8	106.9	20
10	53 50.9	114.9	54 22.9	113.4	54 54.1	112.0	55 24.1	110.5	55 53.1	108.9	10
2 00	55 54.9	117.3	56 28.5	115.8	57 01.0	114.3	57 32.7	112.7	58 03.1	111.1	2 00
1 50	57 56.0	120.0	58 31.5	118.4	59 05.7	116.8	59 38.7	115.2	60 10.7	113.5	1 50
40	59 54.0	122.9	60 31.3	121.4	61 07.2	119.7	61 42.4	118.0	62 16.1	116.3	40
30	61 47.6	126.2	62 27.1	124.6	63 05.4	123.0	63 42.4	121.2	64 18.2	119.4	30
20	63 36.4	130.0	64 18.1	128.3	64 58.6	126.6	65 38.4	124.8	66 16.5	122.9	20
10	65 19.0	134.2	66 03.4	132.5	66 46.8	130.8	67 29.5	129.0	68 09.6	127.0	10
1 00	66 64.0	138.9	67 41.1	137.3	68 27.1	135.6	69 12.5	133.8	69 56.4	131.8	1 00
0 50	68 19.8	144.3	69 09.8	142.8	69 59.0	141.1	70 47.2	139.3	71 34.5	137.4	0 50
40	69 34.5	150.3	70 27.5	148.9	71 19.6	147.4	72 11.7	145.7	73 02.4	144.0	40
30	70 36.0	157.0	71 31.5	155.8	72 26.8	154.6	73 21.5	153.1	74 15.8	151.6	30
20	71 22.0	164.2	72 19.9	163.4	73 17.5	162.5	74 15.1	161.4	75 12.4	160.3	20
10	71 50.4	172.0	72 49.9	171.6	73 49.2	171.1	74 48.5	170.5	75 47.8	169.9	10
0 00	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 09.5	77.0	0 33.4	76.1	0 57.3	75.2	6 20
10	1 37.3	79.8	2 00.8	78.9	2 24.3	78.0	2 47.8	77.1	3 11.1	76.1	10
6 00	3 53.4	80.8	4 16.5	79.9	4 39.6	78.9	5 02.6	78.0	5 25.5	77.1	6 00
5 50	6 09.8	81.7	6 32.5	80.8	6 55.2	79.9	7 17.8	78.9	7 40.1	78.0	5 50
40	8 26.7	82.7	8 49.1	81.7	9 11.4	80.8	9 33.6	79.9	9 55.5	78.9	40
30	10 43.7	83.6	11 05.8	82.7	11 27.8	81.7	11 49.6	80.7	12 11.4	79.8	30
20	13 01.1	84.5	13 23.0	83.6	13 44.7	82.6	14 06.2	81.6	14 27.3	80.7	20
10	15 18.6	85.5	15 40.3	84.5	16 01.7	83.5	16 22.8	82.5	16 43.7	81.6	10
5 00	17 36.4	86.4	17 57.8	85.4	18 19.0	84.4	18 40.0	83.4	19 00.5	82.4	5 00
4 50	19 54.2	87.3	20 15.6	86.3	20 36.5	85.3	20 57.1	84.3	21 17.4	83.3	4 50
40	22 12.2	88.3	22 33.4	87.3	22 54.2	86.2	23 14.7	85.2	23 34.7	84.2	40
30	24 30.3	89.2	24 51.4	88.2	25 12.1	87.1	25 32.2	86.1	25 52.1	85.1	30
20	26 48.4	90.2	27 09.4	89.1	27 30.0	88.1	27 50.2	87.0	28 09.8	86.0	20
10	29 06.3	91.2	29 27.4	90.1	29 47.9	89.0	30 08.1	87.9	30 27.6	86.8	10
4 00	31 24.4	92.2	31 45.5	91.1	32 06.1	90.0	32 26.2	88.9	32 45.6	87.7	4 00
3 50	33 42.3	93.2	34 03.4	92.1	34 24.2	91.0	34 44.1	89.8	35 03.5	88.7	3 50
40	36 00.1	94.3	36 21.5	93.2	36 42.2	92.0	37 02.4	90.8	37 21.6	89.6	40
30	38 17.6	95.4	38 39.3	94.2	39 00.4	93.1	39 20.4	91.8	39 40.3	90.6	30
20	40 35.0	96.6	40 56.9	95.4	41 17.9	94.2	41 38.3	92.9	41 57.7	91.6	20
10	42 51.9	97.9	43 14.1	96.6	43 35.5	95.3	43 56.1	94.0	44 15.7	92.7	10
3 00	45 08.5	99.2	45 31.2	97.9	45 52.9	96.5	46 13.8	95.2	46 33.6	93.8	3 00
2 50	47 24.4	100.6	47 47.7	99.2	48 09.9	97.8	48 31.1	96.4	48 51.1	95.0	2 50
40	49 39.9	102.0	50 03.8	100.6	50 26.4	99.2	50 48.1	97.7	51 08.7	96.2	40
30	51 54.6	103.6	52 19.0	102.1	52 42.5	100.6	53 04.7	99.1	53 25.7	97.5	30
20	54 08.3	105.4	54 33.6	103.8	54 57.8	102.2	55 20.9	100.6	55 42.4	99.0	20
10	56 21.6	107.3	56 47.1	105.7	57 12.4	104.0	57 36.1	102.3	57 58.4	100.5	10
2 00	58 31.9	109.4	58 59.4	107.7	59 25.7	105.9	59 50.6	104.1	60 13.9	102.3	2 00
1 50	60 41.1	111.8	61 10.1	110.0	61 37.7	108.1	62 03.7	106.2	62 28.1	104.2	1 50
40	62 48.2	114.4	63 18.8	112.5	63 47.9	110.6	64 15.7	108.5	64 41.5	106.4	40
30	64 52.4	117.4	65 25.0	115.4	65 56.0	113.4	66 25.4	111.2	66 52.7	109.0	30
20	66 52.9	120.9	67 27.9	118.8	68 01.2	116.6	68 33.0	114.3	69 02.4	111.9	20
10	68 49.0	125.0	69 26.6	122.8	70 02.4	120.5	70 36.5	118.0	71 08.7	115.4	10
1 00	70 38.7	129.7	71 19.5	127.5	71 58.7	125.0	72 36.3	122.5	73 11.4	119.7	1 00
0 50	72 20.2	135.3	73 05.0	133.1	73 47.7	130.6	74 28.5	128.0	75 07.7	125.0	0 50
40	73 51.9	142.0	74 40.4	139.9	75 27.3	137.4	76 12.8	134.8	76 56.2	131.8	40
30	75 09.0	149.8	76 01.5	148.0	76 53.4	145.7	77 43.2	143.3	78 31.5	140.4	30
20	76 08.9	158.9	77 05.2	157.5	78 00.9	155.7	78 56.1	153.8	79 49.8	151.4	20
10	76 46.9	169.2	77 45.9	168.4	78 44.7	167.4	79 43.3	166.2	80 41.6	164.8	10
0 00	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 22.2	70.6	0 46.7	69.7	6 30
20	1 21.2	74.3	1 45.2	73.4	2 09.0	72.4	2 32.9	71.5	2 56.6	70.6	20
10	3 34.4	75.2	3 57.9	74.3	4 20.9	73.4	4 44.1	72.5	5 07.1	71.5	10
6 00	5 48.3	76.1	6 10.9	75.2	6 33.6	74.3	6 56.1	73.4	7 18.5	72.4	6 00
5 50	8 02.5	77.1	8 24.7	76.1	8 46.7	75.2	9 08.7	74.2	9 30.4	73.3	5 50
40	10 17.4	78.0	10 39.0	77.0	11 00.6	76.1	11 21.8	75.1	11 43.0	74.2	40
30	12 32.6	78.8	12 53.7	77.9	13 14.7	77.0	13 35.5	76.0	13 56.0	75.0	30
20	14 48.3	79.7	15 09.0	78.7	15 29.5	77.8	15 49.7	76.8	16 09.7	75.8	20
10	17 04.2	80.6	17 24.6	79.6	17 44.6	78.6	18 04.1	77.6	18 23.7	76.6	10
5 00	19 20.7	81.4	19 40.6	80.4	20 00.2	79.4	20 19.4	78.4	20 38.3	77.4	5 00
4 50	21 37.3	82.3	21 56.9	81.3	22 16.0	80.2	22 34.8	79.2	22 53.2	78.2	4 50
40	23 54.4	83.2	24 13.5	82.1	24 32.3	81.0	24 50.6	80.0	25 08.6	79.0	40
30	26 11.5	84.0	26 30.6	83.0	26 48.8	81.9	27 06.9	80.8	27 24.3	79.7	30
20	28 28.9	84.9	28 47.6	83.8	29 05.7	82.7	29 23.3	81.6	29 40.3	80.5	20
10	30 46.5	85.7	31 04.9	84.6	31 22.7	83.5	31 39.7	82.4	31 56.6	81.3	10
4 00	33 04.4	86.6	33 22.5	85.5	33 40.1	84.3	33 56.9	83.2	34 13.2	82.0	4 00
3 50	35 22.1	87.5	35 40.1	86.4	35 57.5	85.2	36 14.1	84.0	36 30.2	82.8	3 50
40	37 40.3	88.4	37 58.1	87.2	38 15.3	86.0	38 31.6	84.8	38 47.3	83.5	40
30	39 58.2	89.4	40 15.7	88.1	40 33.0	86.9	40 49.1	85.6	41 04.5	84.3	30
20	42 16.4	90.4	42 34.1	89.1	42 51.0	87.7	43 06.9	86.4	43 22.0	85.1	20
10	44 34.4	91.4	44 52.1	90.0	45 08.9	88.6	45 24.8	87.3	45 39.7	85.9	10
3 00	46 52.4	92.4	47 10.2	91.0	47 27.1	89.6	47 42.7	88.2	47 57.4	86.7	3 00
2 50	49 10.2	93.5	49 28.2	92.1	49 45.0	90.6	50 00.9	89.1	50 15.3	87.6	2 50
40	51 28.0	94.7	51 46.1	93.2	52 03.1	91.6	52 18.8	90.0	52 33.3	88.4	40
30	53 45.4	95.9	54 03.9	94.3	54 21.0	92.7	54 36.9	91.0	54 51.4	89.3	30
20	56 02.7	97.3	56 21.5	95.6	56 39.0	93.9	56 54.9	92.1	57 09.4	90.3	20
10	58 19.4	98.8	58 38.7	97.0	58 56.6	95.2	59 13.0	93.3	59 27.4	91.3	10
2 00	60 35.6	100.4	60 55.5	98.4	61 14.0	96.5	61 30.6	94.5	61 45.4	92.5	2 00
1 50	62 50.1	102.2	63 11.7	100.1	63 31.0	98.0	63 48.1	95.9	64 03.4	93.7	1 50
40	65 05.4	104.3	65 27.2	102.1	65 47.3	99.8	66 05.2	97.4	66 21.0	95.1	40
30	67 18.4	106.6	67 41.7	104.2	68 02.9	101.7	68 22.0	99.2	68 38.2	96.6	30
20	69 29.8	109.4	69 54.8	106.8	70 17.6	104.1	70 37.7	101.3	70 55.4	98.3	20
10	71 38.5	112.7	72 05.7	109.9	72 30.7	106.9	72 52.7	103.8	73 11.5	100.5	10
1 00	73 44.1	116.8	74 14.3	113.6	74 41.6	110.4	75 05.6	106.8	75 26.6	103.1	1 00
0 50	75 44.2	121.9	76 18.2	118.5	76 49.0	114.8	77 16.8	110.8	77 40.0	106.6	0 50
40	77 37.4	128.5	78 15.8	124.8	78 51.4	120.8	79 22.8	116.3	79 50.4	111.3	40
30	79 18.5	137.2	80 03.0	133.4	80 45.0	129.1	81 23.0	124.0	81 54.0	118.4	30
20	80 42.4	148.6	81 33.8	145.2	82 22.7	141.0	83 08.9	136.0	83 51.2	129.7	20
10	81 39.5	163.1	82 36.8	161.0	83 33.4	158.2	84 28.8	154.4	85 22.2	149.3	10
0 00	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 19.0	65.0	0 44.3	64.1	6 40
30	1 11.2	68.8	1 35.8	67.8	2 00.2	66.9	2 24.6	66.0	2 49.0	65.1	30
20	3 20.4	69.7	3 44.1	68.7	4 07.7	67.8	4 31.2	66.9	4 54.7	66.0	20
10	5 30.2	70.6	5 53.2	69.6	6 15.8	68.7	6 38.6	67.8	7 01.2	66.8	10
6 00	7 40.8	71.5	8 02.9	70.5	8 25.0	69.6	8 46.9	68.7	9 08.7	67.7	6 00
5 50	9 51.9	72.4	10 13.5	71.4	10 34.7	70.5	10 55.8	69.5	11 16.7	68.6	5 50
40	12 03.9	73.2	12 24.6	72.2	12 45.2	71.3	13 05.6	70.3	13 25.7	69.4	40
30	14 16.3	74.0	14 36.4	73.0	14 56.2	72.1	15 15.8	71.1	15 35.1	70.1	30
20	16 29.4	74.8	16 48.7	73.8	17 07.9	72.9	17 26.8	71.9	17 45.3	70.9	20
10	18 42.8	75.6	19 01.7	74.6	19 20.1	73.6	19 38.2	72.6	19 56.0	71.6	10
5 00	20 56.8	76.4	21 15.0	75.4	21 32.8	74.4	21 50.2	73.3	22 07.3	72.3	5 00
4 50	23 11.2	77.2	23 28.8	76.1	23 45.9	75.1	24 02.7	74.0	24 19.0	73.0	4 50
40	25 26.0	77.9	25 43.0	76.8	25 59.6	75.8	26 15.8	74.7	26 31.3	73.7	40
30	27 41.2	78.6	27 57.7	77.5	28 13.6	76.5	28 29.1	75.4	28 43.9	74.3	30
20	29 56.8	79.4	30 12.7	78.3	30 28.1	77.2	30 42.9	76.0	30 57.1	75.0	20
10	32 12.7	80.1	32 28.1	79.0	32 42.8	77.8	32 57.0	76.7	33 10.5	75.6	10
4 00	34 28.8	80.8	34 43.8	79.7	34 58.0	78.5	35 11.6	77.3	35 24.5	76.1	4 00
3 50	36 45.2	81.6	36 59.7	80.4	37 13.4	79.1	37 26.4	77.9	37 38.6	76.7	3 50
40	39 02.0	82.3	39 16.0	81.0	39 29.3	79.8	39 41.6	78.5	39 53.2	77.2	40
30	41 18.9	83.0	41 32.6	81.7	41 45.9	80.4	41 57.0	79.1	42 07.9	77.8	30
20	43 36.1	83.8	43 49.2	82.4	44 01.5	81.1	44 12.8	79.7	44 23.0	78.4	20
10	45 53.5	84.5	46 06.2	83.1	46 18.0	81.7	46 28.7	80.3	46 38.5	78.9	10
3 00	48 10.9	85.3	48 23.3	83.8	48 34.7	82.3	48 45.0	80.8	48 54.0	79.4	3 00
2 50	50 28.6	86.0	50 40.8	84.5	50 51.7	82.9	51 01.2	81.4	51 09.6	79.8	2 50
40	52 46.5	86.8	52 58.2	85.2	53 08.8	83.6	53 18.0	81.9	53 25.7	80.3	40
30	55 04.4	87.7	55 16.0	85.9	55 26.1	84.2	55 34.7	82.4	55 41.7	80.7	30
20	57 22.3	88.5	57 33.6	86.7	57 43.5	84.8	57 51.8	83.0	57 58.2	81.1	20
10	59 40.4	89.4	59 51.8	87.5	60 01.0	85.5	60 08.7	83.5	60 14.6	81.5	10
2 00	61 58.4	90.4	62 09.5	88.3	62 18.7	86.2	62 26.2	84.0	62 31.3	81.9	2 00
1 50	64 16.5	91.4	64 27.7	89.2	64 36.5	86.9	64 43.5	84.5	64 48.0	82.2	1 50
40	66 34.5	92.7	66 45.6	90.1	66 54.6	87.6	67 01.1	85.1	67 05.0	82.5	40
30	68 52.2	93.9	69 03.7	91.1	69 12.5	88.4	69 18.5	85.6	69 21.7	82.8	30
20	71 10.1	95.4	71 21.7	92.3	71 30.6	89.2	71 36.3	86.1	71 38.9	82.9	20
10	73 27.0	97.2	73 40.0	93.7	73 48.5	90.2	73 54.0	86.6	73 55.7	83.0	10
1 00	75 43.9	99.3	75 57.1	95.3	76 06.7	91.2	76 11.9	87.1	76 12.9	83.0	1 00
0 50	77 59.5	102.1	78 15.0	97.4	78 24.7	92.6	78 30.0	87.6	78 29.7	82.8	0 50
40	80 13.5	105.9	80 30.9	100.3	80 42.5	94.2	80 47.7	88.1	80 46.6	81.9	40
30	82 24.0	111.9	82 46.5	104.6	83 00.0	96.6	83 05.5	88.5	83 02.5	80.4	30
20	84 27.9	121.9	84 57.0	112.4	85 16.4	101.2	85 23.8	89.0	85 18.5	76.7	20
10	86 12.3	141.7	86 56.3	130.3	87 29.1	113.0	87 42.0	89.5	87 30.0	66.0	10
0 00	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	89 0.0	0.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 18.1	91.0	1 54.6	91.9	1 31.0	92.8	1 07.6	93.7	0 43.9	94.7	5 50
40	4 36.1	92.0	4 12.5	92.9	3 48.8	93.8	3 25.3	94.7	3 01.5	95.6	40
30	6 54.0	92.9	6 30.3	93.9	6 06.6	94.8	5 42.8	95.7	5 18.8	96.6	30
20	9 11.9	93.9	8 48.0	94.9	8 24.1	95.8	8 00.0	96.7	7 35.8	97.7	20
10	11 29.5	95.0	11 05.5	95.9	10 41.2	96.8	10 17.0	97.7	9 52.4	98.7	10
5 00	13 47.0	96.0	13 22.7	96.9	12 58.3	97.9	12 33.6	98.8	12 08.8	99.7	5 00
4 50	16 04.2	97.0	15 39.6	98.0	15 14.8	98.9	14 49.9	99.9	14 24.6	100.8	4 50
40	18 21.0	98.1	17 56.1	99.1	17 31.0	100.0	17 05.7	101.0	16 40.0	101.9	40
30	20 37.6	99.2	20 12.3	100.2	19 46.7	101.1	19 20.9	102.1	18 54.8	103.0	30
20	22 53.6	100.3	22 27.9	101.3	22 02.0	102.3	21 35.7	103.3	21 09.0	104.2	20
10	25 09.2	101.5	24 43.1	102.5	24 16.5	103.5	23 49.7	104.5	23 22.4	105.4	10
4 00	27 24.2	102.7	26 57.6	103.7	26 30.5	104.7	26 03.1	105.7	25 35.2	106.7	4 00
3 50	29 38.6	104.0	29 11.4	105.0	28 43.6	106.0	28 15.6	107.0	27 47.0	108.0	3 50
40	31 52.1	105.3	31 24.3	106.3	30 55.9	107.4	30 27.1	108.4	29 57.8	109.4	40
30	34 04.9	106.7	33 36.2	107.7	33 07.2	108.8	32 37.6	109.8	32 07.4	110.9	30
20	36 16.6	108.2	35 47.2	109.2	35 17.2	110.3	34 46.8	111.3	34 15.8	112.4	20
10	38 27.2	109.7	37 56.9	110.8	37 26.1	111.9	36 54.7	113.0	36 22.7	114.0	10
3 00	40 36.5	111.4	40 05.3	112.5	39 33.5	113.6	39 01.0	114.7	38 28.0	115.7	3 00
2 50	42 44.3	113.1	42 12.1	114.2	41 39.1	115.4	41 05.7	116.5	40 31.4	117.5	2 50
40	44 50.5	115.0	44 17.0	116.1	43 42.8	117.3	43 08.1	118.4	42 32.8	119.5	40
30	46 54.6	117.0	46 19.9	118.2	45 44.5	119.4	45 08.4	120.5	44 31.6	121.6	30
20	48 56.5	119.2	48 20.3	120.4	47 43.5	121.6	47 06.0	122.7	46 27.9	123.8	20
10	50 55.6	121.5	50 18.0	122.8	49 39.6	124.0	49 00.7	125.1	48 20.9	126.3	10
2 00	52 51.7	124.1	52 12.5	125.3	51 32.4	126.5	50 51.8	127.7	50 10.4	128.9	2 00
1 50	54 44.0	126.9	54 03.1	128.2	53 21.4	129.4	52 39.0	130.6	51 55.8	131.7	1 50
40	56 32.3	130.0	55 49.3	131.2	55 05.7	132.4	54 21.4	133.6	53 36.6	134.7	40
30	58 15.4	133.3	57 30.6	134.6	56 45.0	135.8	55 58.6	136.9	55 11.8	138.0	30
20	59 52.9	137.0	59 05.8	138.2	58 18.1	139.4	57 29.8	140.5	56 41.0	141.6	20
10	61 23.2	141.1	60 34.1	142.3	59 44.2	143.4	58 53.9	144.5	58 02.9	145.5	10
1 00	62 45.8	145.6	61 54.4	146.7	61 02.3	147.7	60 10.0	148.7	59 17.2	149.6	1 00
0 50	63 59.1	150.5	63 05.4	151.5	62 11.4	152.4	61 17.0	153.3	60 22.2	154.1	0 50
40	65 01.7	155.7	64 05.9	156.6	63 10.0	157.4	62 13.8	158.2	61 17.4	158.9	40
30	65 52.3	161.4	64 54.9	162.1	63 57.2	162.7	62 59.5	163.3	62 01.5	163.9	30
20	66 29.5	167.4	65 30.6	167.9	64 31.7	168.3	63 32.8	168.7	62 33.8	169.1	20
10	66 52.3	173.6	65 52.6	173.9	64 52.9	174.1	63 53.2	174.3	62 53.4	174.5	10
0 00	67 0.0	180.0	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 20.4	95.6									5 50
40	2 37.7	96.6	2 13.9	97.5	1 50.0	98.4	1 26.2	99.3	1 02.3	100.2	40
30	4 54.7	97.6	4 30.6	98.5	4 06.5	99.4	3 42.2	100.3	3 17.7	101.2	30
20	7 11.5	98.6	6 47.1	99.5	6 22.4	100.4	5 57.9	101.3	5 33.1	102.2	20
10	9 27.8	99.6	9 03.1	100.5	8 38.0	101.5	8 13.0	102.4	7 47.8	103.3	10
5 00	11 43.8	100.7	11 18.5	101.6	10 53.1	102.5	10 27.6	103.4	10 01.9	104.3	5 00
4 50	13 59.1	101.8	13 33.5	102.7	13 07.6	103.6	12 41.6	104.5	12 15.2	105.4	4 50
40	16 14.2	102.9	15 47.9	103.8	15 21.5	104.7	14 55.0	105.7	14 28.1	106.6	40
30	18 28.4	104.0	18 01.7	104.9	17 34.7	105.8	17 07.4	106.8	16 40.0	107.7	30
20	20 42.1	105.2	20 14.7	106.1	19 47.1	107.1	19 19.3	108.0	18 51.1	108.9	20
10	22 54.9	106.4	22 26.9	107.4	21 58.6	108.3	21 30.1	109.3	21 01.1	110.2	10
4 00	25 07.0	107.7	24 38.3	108.7	24 09.3	109.6	23 39.9	110.6	23 10.3	111.5	4 00
3 50	27 18.0	109.0	26 48.6	110.0	26 18.8	110.9	25 48 6	111.9	25 18.0	112.9	3 50
40	29 28.0	110.4	28 57.8	111.4	28 27.1	112.4	27 56.1	113.3	27 24.7	114.3	40
30	31 36.7	111.9	31 05.7	112.9	30 34.1	113.9	30 02.1	114.8	29 29.7	115.8	30
20	33 44.3	113.4	33 12.2	114.4	32 39.5	115.4	32 06.6	116.4	31 33.2	117.4	20
10	35 50.2	115.1	35 17.1	116.1	34 43.4	117.1	34 09.4	118.1	33 34.7	119.1	10
3 00	37 54.4	116.8	37 20.2	117.8	36 45.5	118.8	36 10.2	119.9	35 34.5	120.9	3 00
2 50	39 56.6	118.6	39 21.2	119.7	38 45.3	120.7	38 08.7	121.7	37 31.8	122.7	2 50
40	41 56.7	120.6	41 20.1	121.6	40 42.8	122.7	40 05.0	123.7	39 26.8	124.7	40
30	44 54.2	122.7	43 16.2	123.7	42 37.6	124.8	41 58.4	125.8	41 18.7	126.8	30
20	45 49.0	124.9	45 09.5	126.0	44 29.3	127.1	43 48.8	128.1	43 07.7	129.1	20
10	47 40 5	127.4	46 59.4	128.4	46 17.8	129.5	45 35.6	130.5	44 53.0	131.5	10
2 00	49 28.4	130.0	48 45.7	131.0	48 02.3	132.1	47 18.7	133.1	46 34.5	134.1	2 00
1 50	51 11.9	132.8	50 27.6	133.8	49 42.6	134.9	48 57.1	135.9	48 11.2	136.9	1 50
40	52 50.9	135.8	52 04.7	136.9	51 17.9	137.9	50 30.8	138.9	49 43.2	139.8	40
30	54 24.2	139.1	53 36.2	140.1	52 47.8	141.1	51 58.7	142.1	51 09.2	143.0	30
20	55 51.5	142.6	55 01.6	143.6	54 11.1	144.6	53 20.5	145.5	52 29.4	146.3	20
10	57 11.6	146.5	56 19.9	147.4	55 27.6	148.3	54 35.6	149.1	53 42.2	149.9	10
1 00	58 23.9	150.5	57 30.3	151.4	56 36.2	152.2	55 42.1	153.0	54 47.6	153.7	1 00
0 50	59 27.1	154.9	58 31.9	155.7	57 36.3	156.4	56 40.4	157.1	55 44.4	157.7	0 50
40	60 20.7	159.6	59 23.9	160.2	58 26.6	160.8	57 29.7	161.3	56 32.3	161.9	40
30	61 03.4	164.4	60 05.2	164.9	59 06.9	165.4	58 08.5	165.8	57 10.0	166.2	30
20	61 34.7	169.5	60 35.6	169.8	59 36.1	170.2	58 37.0	170.5	57 37.7	170.7	20
10	61 53.7	174.7	60 53.9	174.9	59 54.1	175.1	58 54.3	175.2	57 54.4	175.3	10
0 00	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 38.4	101.1	0 14.4	102.1							5 40
30	2 53.6	102.2	2 29.1	103.1	2 04.7	104.0	1 40.2	104.9	1 15.8	105.8	30
20	5 08.3	103.2	4 43.4	104.1	4 18.5	105.0	3 53.5	105.9	3 28.4	106.8	20
10	7 22.5	104.2	6 57.1	105.1	6 31.6	106.0	6 05.9	106.9	5 40.1	107.8	10
5 00	9 36.0	105.3	9 10.0	106.2	8 43.8	107.1	8 17.7	108.0	7 51.2	108.9	5 00
4 50	11 48.9	106.4	11 22.3	107.3	10 55.5	108.2	10 28.6	109.1	10 01.4	110.0	4 50
40	14 01.0	107.5	13 33.7	108.4	13 06.2	109.3	12 38.6	110.2	12 10.7	111.1	40
30	16 12.5	108.7	15 44.3	109.6	15 16.1	110.5	14 47.6	111.3	14 18.9	112.1	30
20	18 22.6	109.9	17 53.8	110.8	17 24.9	111.7	16 55.6	112.6	16 26.2	113.5	20
10	20 31.9	111.1	20 02.4	112.1	19 32.6	113.0	19 02.5	113.9	18 32.1	114.8	10
4 00	22 40.2	112.4	22 09.7	113.4	21 39.0	114.3	21 08.2	115.2	20 36.8	116.1	4 00
3 50	24 47.2	113.8	24 15.8	114.8	23 44.3	115.7	23 12.3	116.6	22 39.7	117.5	3 50
40	26 52.7	115.3	26 20.5	116.2	25 47.8	117.1	25 15.0	118.1	24 41.6	119.0	40
30	28 56.9	116.8	28 23.6	117.7	27 50.0	118.7	27 15.9	119.6	26 41.6	120.5	30
20	30 59.3	118.4	30 24.9	119.3	29 50.1	120.3	29 15.1	121.2	28 39.5	122.1	20
10	32 59.8	120.1	32 24.4	121.0	31 48.4	122.0	31 12.1	122.9	30 35.4	123.7	10
3 00	34 58.3	121.8	34 21.6	122.8	33 41.4	123.7	33 06.9	124.7	32 28.9	125.6	3 00
2 50	36 54.4	123.7	36 16.4	124.7	35 38.0	125.6	34 59.1	126.6	34 19.9	127.5	2 50
40	38 47.9	125.7	38 08.6	126.7	37 28.8	127.6	37 48.8	128.6	36 08.1	129.5	40
30	40 38.6	127.8	39 57.8	128.8	39 16.7	129.7	38 35.1	130.7	37 53.1	131.6	30
20	42 26.0	130.1	41 43.8	131.1	41 01.1	132.0	40 18.2	132.9	39 34.6	133.8	20
10	44 09.8	132.5	43 26.1	133.5	42 42.0	134.4	41 57.4	135.3	41 12.3	136.2	10
2 00	45 49.6	135.0	45 04.2	136.0	44 18.5	136.9	43 32.4	137.8	42 45.9	138.6	2 00
1 50	47 24.8	137.8	46 37.8	138.7	45 50.5	139.6	45 02.7	140.5	44 14.7	141.3	1 50
40	48 54.9	140.7	48 06.3	141.6	47 17.3	142.5	46 28.1	143.3	45 38.4	144.1	40
30	50 19.5	143.8	49 29.2	144.7	48 38.7	145.5	47 47.7	146.3	46 56.4	147.1	30
20	51 37.7	147.1	50 45.8	147.9	49 53.5	148.7	49 01.3	149.5	48 08.4	150.2	20
10	52 49.2	150.7	51 55.6	151.4	51 01.8	152.1	50 07.7	152.8	49 13.7	153.5	10
1 00	53 52.8	154.4	52 57.7	155.1	52 02.5	155.7	51 07.3	156.3	50 11.7	156.9	1 00
0 50	54 48.2	158.3	53 51.9	158.9	52 55.3	159.5	51 58.5	160.0	51 01.7	160.5	0 50
40	55 34.8	162.4	54 37.1	162.9	53 39.3	163.4	52 41.6	163.8	51 43.6	164.2	40
30	56 11.6	166.7	55 12.9	167.0	54 15.3	167.4	53 15.7	167.7	52 16.7	168.1	30
20	56 38.3	171.0	55 39.0	171.3	54 39.5	171.5	53 40.2	171.7	52 40.7	172.0	20
10	56 54.6	175.4	55 54.8	175.6	54 54.9	175.7	53 55.0	175.8	52 55.2	176.0	10
0 00	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 51.4	106.7	0 26.7	107.6	0 02.1	108.6					5 30
20	3 03.2	107.7	2 38.0	108.6	2 12.8	109.5	1 47.5	110.4	1 22.2	111.4	20
10	5 14.4	108.7	4 48.4	109.6	4 22.5	110.6	3 56.4	111.5	3 30.3	112.4	10
5 00	7 24.7	109.8	6 58.0	110.7	6 31.4	111.6	6 04.5	112.5	5 37.6	113.4	5 00
4 50	9 34.1	110.9	9 06.7	111.8	8 39.1	112.7	8 11.5	113.6	7 43.7	114.5	4 50
40	11 42.7	112.0	11 14.4	112.9	10 46.1	113.8	10 17.5	114.7	9 48.9	115.6	40
30	13 50.1	113.2	13 21.1	114.1	12 51.7	115.0	12 22.3	115.9	11 52.8	116.8	30
20	15 56.4	114.4	15 26.4	115.3	14 56.3	116.2	14 26.0	117.1	13 55.4	118.0	20
10	18 01.4	115.7	17 30.6	116.6	16 59.4	117.5	16 28.0	118.4	15 56.5	119.3	10
4 00	20 05.2	117.0	19 33.3	117.9	19 01.2	118.8	18 28.8	119.7	17 56.1	120.6	4 00
3 50	22 07.4	118.4	21 34.4	119.3	21 01.3	120.2	20 27.8	121.1	19 54.2	122.0	3 50
40	24 08.0	119.9	23 34.0	120.8	22 59.7	121.7	22 25.2	122.6	21 50.3	123.5	40
30	26 06.6	121.4	25 31.6	122.3	24 56.2	123.2	24 20.5	124.1	23 44.5	125.0	30
20	28 03.6	123.0	27 27.3	123.9	26 50.8	124.8	26 13.8	125.7	25 36.6	126.6	20
10	29 58.3	124.7	29 20.7	125.6	28 42.9	126.5	28 04.7	127.4	27 26.3	128.3	10
3 00	31 50.6	126.5	31 11.8	127.4	30 32.7	128.3	29 53.2	129.1	29 13.4	130.0	3 00
2 50	33 40.2	128.4	33 00.1	129.2	32 19.3	130.1	31 38.9	131.0	30 57.5	131.9	2 50
40	35 27.0	130.4	34 45.5	131.2	34 03.7	132.1	33 21.6	133.0	32 39.0	133.8	40
30	37 10.7	132.5	36 27.7	133.3	35 44.4	134.2	35 00.7	135.0	34 17.1	135.8	30
20	38 50.7	134.7	38 06.4	135.5	37 21.7	136.4	36 36.7	137.2	35 51.3	138.0	20
10	40 27.0	137.1	39 41.1	137.9	38 55.0	138.7	38 08.5	139.5	37 21.6	140.3	10
2 00	41 58.9	139.5	41 11.5	140.3	40 24.0	141.1	39 36.0	141.9	38 47.7	142.7	2 00
1 50	43 26.2	142.1	42 37.3	142.9	41 48.2	143.7	40 58.7	144.4	40 09.0	145.2	1 50
40	44 48.4	144.9	43 57.9	145.6	43 07.4	146.4	42 16.5	147.1	41 25.3	147.8	40
30	46 05.0	147.8	45 13.0	148.5	44 20.9	149.2	43 28.6	149.9	42 36.0	150.6	30
20	47 15.4	150.9	46 22.0	151.6	45 28.5	152.2	44 34.8	152.8	43 40.9	153.4	20
10	48 19.1	154.1	47 24.4	154.7	46 29.7	155.3	45 34.6	155.9	44 39.4	156.5	10
1 00	49 15.8	157.5	48 19.9	158.0	47 23.8	158.6	46 27.5	159.1	45 31.1	159.6	1 00
0 50	50 04.7	161.0	49 07.6	161.5	48 10.5	162.0	47 13.1	162.4	46 15.7	162.8	0 50
40	50 45.6	164.6	49 47.4	165.0	48 49.4	165.4	47 51.1	165.8	46 52.7	166.1	40
30	51 17.8	168.4	50 18.9	168.7	49 20.0	169.0	48 21.0	169.2	47 21.9	169.5	30
20	51 41.2	172.2	50 41.7	172.4	49 42.2	172.6	48 42.5	172.8	47 43.0	173.0	20
10	51 55.3	176.1	50 55.4	176.2	49 55.6	176.3	48 55.7	176.4	47 55.8	176.5	10
0 00	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 56.9	112.3	0 31.6	113.2	0 06.3	114.1					5 20
10	3 04.2	113.3	2 38.1	114.2	2 11.8	115.1	1 45.6	116.0	1 19.3	116.9	10
5 00	5 10.6	114.3	4 43.5	115.2	4 16.5	116.1	3 49.3	117.0	3 22.0	117.9	5 00
4 50	7 15.9	115.4	6 47.9	116.3	6 19.8	117.2	5 51.6	118.1	5 23.4	119.0	4 50
40	9 20.0	116.5	8 51.1	117.4	8 22.1	118.3	7 53.0	119.2	7 23.6	120.1	40
30	11 22.9	117.7	10 53.1	118.6	10 22.9	119.5	9 52.7	120.3	9 22.4	121.2	30
20	13 24.6	118.9	12 53.6	119.8	12 22.5	120.7	11 51.3	121.5	11 19.8	122.4	20
10	15 24.8	120.2	14 52.7	121.1	14 20.5	121.9	13 48.1	122.8	13 15.6	123.6	10
4 00	17 23.3	121.5	16 50.2	122.4	16 16.9	123.2	15 43.4	124.1	15 09.7	124.9	4 00
3 50	19 20.2	122.8	18 45.9	123.7	18 11.4	124.6	17 36.8	125.5	17 01.9	126.3	3 50
40	21 15.2	124.3	20 39.8	125.2	20 04.2	126.1	19 28.3	126.9	18 52.2	127.8	40
30	23 08.2	125.8	22 31.6	126.7	21 54.7	127.6	21 17.6	128.4	20 40.2	129.3	30
20	24 59.0	127.4	24 21.2	128.3	23 43.1	129.1	23 04.7	130.0	22 26.0	130.8	20
10	26 47.6	129.1	26 08.3	130.0	25 28.9	130.8	24 49.2	131.6	24 09.4	132.5	10
3 00	28 33.2	130.8	27 52.8	131.7	27 12.1	132.5	26 31.2	133.3	25 49.8	134.2	3 00
2 50	30 16.3	132.7	29 34.5	133.5	28 52.4	134.3	28 10.0	135.1	27 27.3	135.9	2 50
40	31 56.2	134.6	31 13.0	135.4	30 29.6	136.2	29 45.8	137.0	29 01.8	137.8	40
30	33 32.8	136.7	32 48.2	137.5	32 03.3	138.3	31 18.2	139.1	30 32.7	139.8	30
20	35 05.6	138.8	34 19.6	139.6	33 33.4	140.3	32 46.9	141.1	32 00.0	141.9	20
10	36 34.6	141.1	35 47.2	141.9	34 59.4	142.6	34 11.5	143.3	33 23.2	144.0	10
2 00	37 59.1	143.4	37 10.2	144.1	36 21.1	144.8	35 31.9	145.6	34 42.3	146.3	2 00
1 50	39 19.1	145.9	38 28.7	146.6	37 38.2	147.3	36 47.6	148.0	35 55.9	148.6	1 50
40	40 33.9	148.5	39 42.2	149.2	38 50.4	149.8	37 58.4	150.5	37 06.1	151.1	40
30	41 43.3	151.2	40 50.2	151.9	39 57.1	152.5	39 03.7	153.0	38 10.1	153.6	30
20	42 46.8	154.0	41 52.5	154.6	40 58.1	155.2	40 03.5	155.7	39 08.7	156.3	20
10	43 44.1	157.0	42 48.7	157.5	41 52.9	158.0	40 57.2	158.5	40 01.3	159.0	10
1 00	44 34.6	160.0	43 38.0	160.5	42 41.4	160.9	41 44.6	161.4	40 47.7	161.8	1 00
0 50	45 18.2	163.2	44 20.7	163.6	43 23.0	164.0	42 25.2	164.4	41 27.4	164.7	0 50
40	45 54.4	166.4	44 56.0	166.8	43 57.5	167.1	42 59.0	167.4	42 00.5	167.7	40
30	46 22.9	169.8	45 23.9	170.0	44 24.7	170.2	43 25.5	170.5	42 26.3	170.7	30
20	46 43.4	173.1	45 43.8	173.3	44 44.3	173.5	43 44.7	173.6	42 45.0	173.8	20
10	46 55.9	176.6	45 56.0	176.6	44 56.1	176.7	43 56.2	176.8	42 56.2	176.9	10
0 00	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 24.3	89.1	0 48.8	88.2	1 13.2	87.3	1 37.5	86.4	6 00
5 50	2 17.0	91.0	2 41.4	90.1	3 05.8	89.2	3 30.2	88.3	3 54.4	87.4	5 50
40	4 34.0	92.0	4 58.4	91.1	5 22.8	90.2	5 47.1	89.3	6 11.3	88.4	40
30	6 50.9	93.1	7 15.3	92.1	7 39.8	91.2	8 04.2	90.3	8 28.3	89.4	30
20	9 07.7	94.1	9 32.2	93.2	9 56.8	92.3	10 21.1	91.3	10 45.4	90.4	20
10	11 24.2	95.2	11 49.1	94.2	12 13.7	93.3	12 38.3	92.3	13 02.4	91.4	10
5 00	13 40.6	96.2	14 05.6	95.3	14 30.3	94.3	14 55.0	93.4	15 19.3	92.5	5 00
4 50	15 56.3	97.3	16 21.9	96.4	16 46.9	95.4	17 11.8	94.5	17 36.2	93.5	4 50
40	18 12.4	98.4	18 37.9	97.5	19 03.2	96.5	19 28.2	95.6	19 52.9	94.6	40
30	20 27.8	99.6	20 53.6	98.6	21 19.1	97.6	21 44.4	96.7	22 09.4	95.7	30
20	22 42.6	100.8	23 08.9	99.8	23 34.8	98.8	24 00.4	97.8	24 25.6	96.8	20
10	24 57.0	102.0	25 23.8	101.0	25 49.9	100.0	26 16.0	99.0	26 41.5	98.0	10
4 00	27 10.7	103.2	27 37.9	102.2	28 04.7	101.2	28 31.1	100.2	28 56.9	99.2	4 00
3 50	29 23.8	104.5	29 51.6	103.5	30 18.8	102.5	30 45.7	101.4	31 12.1	100.4	3 50
40	31 36.0	105.9	32 04.3	104.9	32 32.2	103.8	32 59.6	102.7	33 26.5	101.7	40
30	33 47.3	107.3	34 16.4	106.3	34 44.9	105.2	35 13.0	104.1	35 40.4	103.0	30
20	35 57.6	108.8	36 27.3	107.8	36 56.7	106.7	37 25.4	105.6	37 53.5	104.4	20
10	38 06.6	110.5	38 37.3	109.4	39 07.3	108.2	39 37.0	107.1	40 05.8	106.0	10
3 00	40 14.4	112.1	40 45.9	111.0	41 16.9	109.9	41 47.2	108.7	42 16.9	107.6	3 00
2 50	42 20.4	113.9	42 53.1	112.8	43 25.0	111.6	43 56.4	110.5	44 27.0	109.3	2 50
40	44 24.7	115.9	44 58.5	114.7	45 31.5	113.5	46 03.9	112.3	46 35.5	111.1	40
30	46 26.8	117.9	47 02.0	116.7	47 36.3	115.5	48 09.9	114.3	48 42.6	113.1	30
20	48 26.8	120.2	49 03.1	118.9	49 38.7	117.7	50 13.6	116.5	50 47.6	115.2	20
10	50 23.8	122.6	51 01.8	121.3	51 38.8	120.1	52 15.1	118.8	52 50.6	117.5	10
2 00	52 17.6	125.2	52 57.0	123.9	53 35.8	122.7	54 13.7	121.3	54 50.7	120.0	2 00
1 50	54 07.6	128.0	54 48.9	126.8	55 29.4	125.5	56 09.0	124.1	56 47.9	122.7	1 50
40	55 53.3	131.1	56 36.4	129.9	57 18.8	128.6	58 00.3	127.2	58 41.0	125.8	40
30	57 33.8	134.5	58 19.1	133.2	59 03.4	132.0	59 47.1	130.6	60 29.9	129.2	30
20	59 08.6	138.2	59 55.8	137.0	60 42.3	135.7	61 28.1	134.4	62 13.1	133.0	20
10	60 36.2	142.2	61 25.8	141.0	62 14.5	139.8	63 02.6	138.5	63 50.0	137.2	10
1 00	61 56.1	146.6	62 47.6	145.5	63 38.8	144.4	64 29.2	143.1	65 19.1	141.8	1 00
0 50	63 06.7	151.4	64 00.4	150.4	64 53.8	149.5	65 46.6	148.2	66 38.8	147.0	0 50
40	64 06.8	156.6	65 02.5	155.7	65 57.9	154.8	66 53.1	153.8	67 47.7	152.7	40
30	64 55.3	162.1	65 52.8	161.4	66 50.0	160.6	67 47.0	159.8	68 44.0	159.0	30
20	65 30.9	167.9	66 29.6	167.4	67 28.4	166.9	68 27.1	166.3	69 25.7	165.7	20
10	65 52.7	173.9	66 52.4	173.6	67 52.1	173.4	68 51.7	173.1	69 51.3	172.8	10
0 00	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 10.0	83.5	0 34.4	82.6	0 59.0	81.7	1 23.4	80.8	6 10
6 00	2 01.9	85.4	2 26.2	84.5	2 50.4	83.6	3 14.7	82.7	3 38.9	81.8	6 00
5 50	4 18.6	86.4	4 42.8	85.5	5 06.8	84.6	5 30.8	83.7	5 54.6	82.8	5 50
40	6 35.5	87.5	6 59.4	86.5	7 23.2	85.6	7 47.0	84.7	6 10.8	83.7	40
30	8 52.4	88.5	9 16.2	87.5	9 39.9	86.6	10 03.6	85.7	10 27.0	84.7	30
20	11 09.4	89.5	11 33.2	88.5	11 56.8	87.6	12 20.3	86.6	12 43.6	85.7	20
10	13 26.4	90.5	13 50.2	89.5	14 13.8	88.6	14 37.2	87.6	15 00.4	86.7	10
5 00	15 43.4	91.5	16 07.3	90.6	16 30.8	89.6	16 54.2	88.6	17 17.3	87.7	5 00
4 50	18 00.4	92.5	18 24.3	91.6	18 47.9	90.6	19 11.2	89.6	19 34.2	88.7	4 50
40	20 17.2	93.6	20 41.2	92.6	21 04.9	91.6	21 28.2	90.6	21 51.2	89.7	40
30	22 33.8	94.7	22 58.0	93.7	23 21.8	92.7	23 45.2	91.7	24 08.3	90.7	30
20	24 50.3	95.8	25 14.7	94.8	25 38.6	93.8	26 02.1	92.8	26 25.2	91.7	20
10	27 06.8	96.9	27 31.1	95.9	27 55.2	94.9	28 18.9	93.8	28 42.2	92.8	10
4 00	29 22.4	98.1	29 47.3	97.1	30 11.6	96.0	30 35.6	95.0	30 59.0	93.9	4 00
3 50	31 37.8	99.3	32 03.1	98.3	32 27.8	97.2	32 52.0	96.1	33 15.5	95.0	3 50
40	33 52.8	100.6	34 18.5	99.5	34 43.5	98.4	35 08.0	97.3	35 32.0	96.2	40
30	36 07.2	101.9	36 33.3	100.8	36 58.9	99.7	37 23.8	98.5	37 48.1	97.4	30
20	38 20.9	103.3	38 47.6	102.2	39 13.6	101.0	39 39.0	99.9	40 03.7	98.7	20
10	40 33.8	104.8	41 01.2	103.6	41 27.9	102.4	41 53.7	101.2	42 19.0	100.0	10
3 00	42 45.8	106.4	43 13.9	105.2	43 41.2	103.9	44 07.8	102.7	44 33.6	101.4	3 00
2 50	44 56.7	108.0	45 25.6	106.8	45 53.8	105.5	46 21.2	104.2	46 47.6	102.9	2 50
40	47 06.4	109.8	47 36.3	108.5	48 05.2	107.2	48 33.4	105.9	49 00.6	104.6	40
30	49 14.5	111.7	49 45.5	110.4	50 15.6	109.1	50 44.6	107.7	51 12.7	106.3	30
20	51 20.8	113.8	51 53.0	112.5	52 24.1	111.1	52 54.4	109.7	53 23.6	108.2	20
10	53 25.0	116.1	53 58.6	114.7	54 31.1	113.3	55 02.6	111.8	55 33.0	110.3	10
2 00	55 26.8	118.6	56 01.9	117.1	56 35.8	115.7	57 08.7	114.1	57 40.6	112.5	2 00
1 50	57 25.6	121.3	58 02.2	119.8	58 37.9	118.3	59 12.6	116.7	59 45.9	115.1	1 50
40	59 20.8	124.3	59 59.4	122.8	60 37.0	121.2	61 13.4	119.6	61 48.6	117.9	40
30	61 11.6	127.7	61 52.4	126.1	62 32.0	124.5	63 10.6	122.9	63 47.9	121.1	30
20	62 57.2	131.5	63 40.3	129.9	64 22.3	128.3	65 03.2	126.6	65 42.9	124.8	20
10	64 36.5	135.7	65 22.0	134.2	66 06.7	132.5	66 50.4	130.8	67 32.5	129.0	10
1 00	66 08.3	140.4	66 56.5	138.9	67 43.7	137.3	68 30.1	135.6	69 15.4	133.8	1 00
0 50	67 30.5	145.7	68 21.6	144.3	69 11.8	142.8	70 01.2	141.1	70 49.5	139.3	0 50
40	68 42.1	151.6	69 35.8	150.3	70 28.9	148.9	71 21.3	147.5	72 13.1	145.8	40
30	69 40.2	158.0	70 36.5	157.0	71 32.4	155.8	72 27.7	154.6	73 22.5	153.2	30
20	70 24.1	165.0	71 22.3	164.3	72 20.1	163.4	73 18.0	162.5	74 15.4	161.5	20
10	70 51.0	172.4	71 50.5	172.0	72 50.0	171.6	73 49.3	171.1	74 48.6	170.5	10
0 00	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 23.0	77.0	0 47.9	76.0	1 12.7	75.2	6 20
10	1 47.9	79.9	2 12.3	78.9	2 36.8	78.0	3 01.1	77.1	3 25.5	76.2	10
6 00	4 03.0	80.9	4 27.1	79.9	4 51.1	79.0	5 15.0	78.1	5 38.9	77.2	6 00
5 50	6 18.5	81.8	6 42.1	80.9	7 05.8	80.0	7 29.1	79.1	7 52.7	78.1	5 50
40	8 34.3	82.8	8 57.7	81.9	9 20.9	80.9	9 44.0	80.0	10 07.0	79.1	40
30	10 50.4	83.8	11 13.4	82.9	11 36.4	81.9	11 59.1	80.9	11 21.8	80.0	30
20	13 06.7	84.8	13 29.6	83.8	13 52.3	82.8	14 14.7	81.9	14 37.0	80.9	20
10	15 23.4	85.7	15 45.9	84.8	16 08.4	83.8	16 30.5	82.8	16 52.4	81.9	10
5 00	17 40.0	86.7	18 02.5	85.7	18 24.7	84.7	18 46.6	83.8	19 08.2	82.8	5 00
4 50	19 56.9	87.7	20 19.2	86.7	20 41.3	85.7	21 02.9	84.7	21 24.2	83.7	4 50
40	22 13.9	88.7	22 36.1	87.7	22 58.0	86.6	23 19.5	85.6	33 40.6	84.6	40
30	24 30.8	89.7	24 52.9	88.6	25 14.8	87.6	25 36.1	86.6	25 57.1	85.5	30
20	26 47.9	90.7	27 10.1	89.6	27 31.8	88.6	27 53.0	87.5	28 13.8	86.5	20
10	29 04.8	91.7	29 27.0	90.6	29 48.8	89.6	30 09.9	88.5	30 30.7	87.4	10
4 00	31 21.8	92.8	31 44.1	91.7	32 05.8	90.6	32 26.9	89.5	32 47.7	88.4	4 00
3 50	33 38.6	93.9	34 01.0	92.8	34 22.8	91.7	34 43.9	90.5	35 04.6	89.4	3 50
40	35 55.3	95.0	36 17.8	93.9	36 39.8	92.7	37 01.0	91.6	37 21.7	90.4	40
30	38 11.5	96.2	38 34.4	95.1	38 56.5	93.9	39 17.9	92.7	39 38.6	91.4	30
20	40 27.7	97.5	40 50.8	96.3	41 13.2	95.0	41 34.7	93.8	41 55.6	92.5	20
10	42 43.3	98.8	43 06.8	97.5	43 29.6	96.2	43 51.8	95.0	44 12.4	83.7	10
3 00	44 58.5	100.1	45 22.5	98.8	45 45.6	97.5	46 07.8	96.2	46 29.1	94.8	3 00
2 50	47 13.1	101.6	47 37.6	100.2	48 01.2	98.8	48 23.8	97.5	48 45.7	96.1	2 50
40	49 27.0	103.2	49 52.1	101.8	50 16.4	100.3	50 39.4	98.9	51 01.5	97.4	40
30	51 39.8	104.9	52 05.8	103.4	52 30.7	101.9	52 54.5	100.4	53 17.8	98.9	30
20	53 51.7	106.7	54 18.7	105.2	54 44.5	103.6	55 08.9	102.0	55 32.4	100.4	20
10	56 02.3	108.7	56 30.3	107 1	56 57.0	105.5	57 22.5	103.8	57 46.7	102.1	10
2 00	58 11.3	110.9	58 40.5	109.2	59 08.4	107.5	59 35.0	105.8	60 00.2	104.0	2 00
1 50	60 18.0	113.4	60 48.7	111.6	61 18.3	109.8	61 46.2	108.0	62 12.5	106.1	1 50
40	62 22.6	116.1	62 55.0	114.3	63 26.1	112.4	63 55.5	110.4	64 23.5	108.4	40
30	64 23.9	119.3	64 58.4	117.4	65 31.4	115.4	66 02.7	113.3	66 32.2	111.1	30
20	66 21.3	122.9	66 58.1	120.9	67 33.5	118.8	68 07.0	116.6	68 38.9	114.3	20
10	68 13.6	127.0	68 53.0	125.0	69 31.0	122.7	70 07.2	120.4	70 41.8	118.0	10
1 00	69 59.5	131.8	70 42.2	129.7	71 23.4	127.5	72 02.7	125.0	72 40.4	122.5	1 00
0 50	71 37.2	137.5	72 23.0	135.4	73 07.7	133.2	73 50.8	130.6	74 32.0	128.0	0 50
40	73 04.1	144.1	73 53.8	142.0	74 42.3	139.9	75 29.3	137.5	76 15.1	134.9	40
30	74 16.7	151.7	75 10.4	149.9	76 02.7	148.0	76 54.5	145.8	77 44.8	143.4	30
20	75 12.6	160.4	76 09.5	159.0	77 06.0	157.6	78 01.5	155.8	78 56.5	153.8	20
10	75 47.9	169.9	76 47.1	169.2	77 46.1	168.4	77 44.9	167.4	79 43.5	166.3	10
0 00	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30					0 16.7	71.5	0 42.6	70.6	1 07.7	69.7	6 30
20	1 37.5	74.3	2 02.3	73.4	2 27.1	72.5	2 51.9	71.6	3 16.6	70.7	20
10	3 49.8	75.3	4 14.0	74.4	4 38.1	73.5	5 02.2	72.5	5 26.2	71.6	10
6 00	6 02.6	76.3	6 26.2	75.3	6 49.8	74.4	7 13.2	73.5	7 36.5	72.5	6 00
5 50	8 15.9	77.2	8 39.0	76.3	9 02.1	75.3	9 24.9	74.4	9 47.6	73.4	5 50
40	10 29.8	78.1	10 52.5	77.2	11 14.9	76.3	11 37.2	75.3	11 59.2	74.3	40
30	12 44.1	79.0	13 06.2	78.1	13 28.1	77.2	13 49.9	76.2	14 11.6	75.2	30
20	14 58.9	80.0	15 20.6	79.0	15 42.0	78.0	16 03.3	77.1	16 24.2	76.1	20
10	17 14.0	80.9	17 35.3	79.9	17 56.4	78.9	18 17.1	77.9	18 37.5	76.9	10
5 00	19 29.4	81.8	19 50.4	80.8	20 11.0	79.8	20 31.3	78.8	20 51.2	77.8	5 00
4 50	21 45.2	82.7	22 05.8	81.7	22 26.1	80.7	22 45.9	79.6	23 05.4	78.6	4 50
40	24 01.3	83.6	24 21.6	82.6	24 41.4	81.5	25 00.8	80.5	25 19.8	79.4	40
30	26 17.5	84.5	26 37.6	83.5	26 57.1	82.4	27 16.1	81.3	27 34.7	80.2	30
20	28 34.1	85.4	28 53.8	84.3	29 13.0	83.2	29 31.8	82.2	29 50.0	81.1	20
10	30 50.8	86.3	31 10.1	85.2	31 29.1	84.1	31 47.6	83.0	32 05.9	81.9	10
4 00	33 07.6	87.3	33 26.9	86.1	33 45.6	85.0	34 03.7	83.8	34 21.2	82.7	4 00
3 50	35 24.4	88.2	35 43.7	87.1	36 02.1	85.9	36 20.1	84.7	36 37.2	83.5	3 50
40	37 41.4	89.2	38 00.6	88.0	38 19.0	86.8	38 36.6	85.6	38 53.5	84.3	40
30	39 59.5	90.2	40 17.6	89.0	40 35.8	87.7	40 53.4	86.4	41 10.0	85.2	30
20	42 15.5	91.2	42 34.6	90.0	42 52.8	88.7	43 10.2	87.3	43 26.6	86.0	20
10	44 32.4	92.3	44 51.7	91.0	45 09.8	89.7	45 27.1	88.3	45 43.5	86.9	10
3 00	46 49.3	93.5	47 08.6	92.1	47 26.9	90.7	47 44.1	89.3	48 00.2	87.8	3 00
2 50	49 06.0	94.7	49 25.4	93.2	49 43.9	91.8	50 01.1	90.3	50 17.2	88.7	2 50
40	51 22.4	95.9	51 42.2	94.4	52 00.8	92.9	52 18.1	91.3	52 34.3	89.7	40
30	53 38.5	97.3	53 58.6	95.7	54 17.4	94.1	54 35.1	92.4	54 51.3	90.8	30
20	55 54.3	98.7	56 14.9	97.1	56 34.1	95.4	56 51.9	93.6	57 08.3	91.9	20
10	58 09.5	100.3	58 30.7	98.6	58 50.4	96.8	59 08.5	94.9	59 25.2	93.0	10
2 00	60 23.8	102.1	60 45.9	100.2	61 06.3	98.3	61 24.9	96.3	61 41.9	94.3	2 00
1 50	62 37.2	104.1	63 00.2	102.1	63 21.5	100.0	63 41.0	97.9	63 58.5	95.7	1 50
40	64 49.5	106.3	65 13.7	104.2	65 36.0	101.9	65 56.3	99.6	66 14.5	97.3	40
30	67 00.0	108.9	67 25.9	106.6	67 49.5	104.2	68 11.0	101.6	68 30.4	99.1	30
20	69 08.6	111.9	69 36.3	109.4	70 01.6	106.8	70 24.6	104.0	70 45.1	101.2	20
10	71 13.9	115.4	71 44.1	112.7	72 11.8	109.9	72 36.2	106.8	72 59.0	103.7	10
1 00	73 15.7	119.8	73 48.7	116.8	74 19.1	113.7	74 46.6	110.4	75 11.0	106.8	1 00
0 50	75 11.2	125.1	75 48.0	122.0	76 22.2	118.6	76 53.5	114.8	77 21.0	110.9	0 50
40	76 58.7	131.9	77 40.1	128.6	78 18.8	124.9	78 54.5	120.9	79 26.3	116.4	40
30	78 33.8	140.5	79 20.8	137.2	80 05.0	133.5	80 47.0	129.1	81 25.5	124.2	30
20	79 50.6	151.5	80 43.5	148.7	81 34.8	145.3	82 24.0	141.2	83 10.3	136.1	20
10	80 41.8	164.9	81 39.8	163.2	82 37.1	161.0	83 33.7	158.3	84 29.2	154.6	10
0 00	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40					0 18.2	65.9	0 44.3	65.0	1 10.5	64.1	6 40
30	1 33.1	68.8	1 58.4	67.9	2 23.7	66.9	2 49.0	66.0	3 14.3	65.1	30
20	3 41.2	69.7	4 05.8	68.8	4 30.2	67.9	4 54.7	67.0	5 19.1	66.1	20
10	5 50.1	70.7	6 13.9	69.8	6 37.7	68.8	7 01.2	67.9	7 24.8	67.0	10
6 00	7 59.7	71.6	8 22.8	70.7	8 45.9	69.7	9 08.7	68.8	9 31.4	67.9	6 00
5 50	10 10.1	72.5	10 32.5	71.6	10 54.8	70.6	11 16.7	69.7	11 38.7	68.8	5 50
40	12 21.1	73.4	12 42.8	72.4	13 04.4	71.5	13 25.7	70.5	13 46.7	69.6	40
30	14 32.7	74.3	14 53.7	73.3	15 14.6	72.3	15 35.1	71.3	15 55.4	70.4	30
20	16 44.9	75.1	17 05.4	74.1	17 25.5	73.1	17 45.3	72.1	18 04.8	71.2	20
10	18 57.7	75.9	19 17.3	74.9	19 36.9	73.9	19 56.0	72.9	20 14.8	71.9	10
5 00	21 10.7	76.8	21 30.0	75.7	21 48.8	74.7	22 07.3	73.7	22 25.3	72.7	5 00
4 50	23 24.3	77.6	23 43.0	76.5	24 01.3	75.5	24 19.0	74.5	24 36.4	73.4	4 50
40	25 38.4	78.4	25 56.5	77.3	26 14.2	76.3	26 31.3	75.2	26 48.0	74.1	40
30	27 52.8	79.2	28 10.4	78.1	28 27.5	77.0	28 43.9	75.9	29 00.0	74.8	30
20	30 07.5	80.0	30 24.6	78.9	30 41.2	77.7	30 57.1	76.6	31 12.5	75.5	20
10	32 22.7	80.7	32 39.2	79.6	32 55.3	78.4	33 10.5	77.3	33 25.3	76.2	10
4 00	34 38.0	81.5	34 54.2	80.3	35 09.7	79.2	35 24.5	78.0	35 38.6	76.8	4 00
3 50	36 53.7	82.3	37 09.4	81.1	37 24.4	79.9	37 38.9	78.7	37 52.1	77.5	3 50
40	39 09.6	83.1	39 24.9	81.9	39 39.5	80.6	39 53.2	79.3	40 06.0	78.1	40
30	41 25.7	83.9	41 40.7	82.6	41 54.7	81.3	42 07.9	80.0	42 20.2	78.7	30
20	43 42.1	84.7	43 56.7	83.3	44 10.4	82.0	44 23.0	80.6	44 34.8	79.3	20
10	45 58.6	85.5	46 12.9	84.1	46 26.2	82.7	46 38.3	81.3	46 49.5	79.9	10
3 00	48 15.3	86.4	48 29.3	84.9	48 42.2	83.4	48 54.0	81.9	49 04.6	80.5	3 00
2 50	50 32.1	87.2	50 45.8	85.7	50 58.4	84.1	51 09.6	82.6	51 19.7	81.0	2 50
40	52 49.0	88.1	53 02.6	86.5	53 14.9	84.9	53 25.7	83.2	53 35.2	81.6	40
30	55 06.0	89.1	55 19.4	87.4	55 31.4	85.6	55 41.7	83.9	55 50.8	82.2	30
20	57 23.0	90.1	57 36.3	88.3	57 48.2	86.4	57 58.2	84.6	58 06.7	82.7	20
10	59 40.1	91.1	59 53.4	89.2	60 04.8	87.2	60 14.6	85.2	60 22.6	83.2	10
2 00	61 57.0	92.3	62 10.3	90.2	62 21.9	88.1	62 31.3	85.9	62 38.9	83.8	2 00
1 50	64 13.9	93.5	64 27.4	91.3	64 39.0	89.0	64 48.0	86.7	64 55.0	84.3	1 50
40	66 30.5	94.9	66 44.4	92.4	66 55.9	89.9	67 05.0	87.4	67 11.6	84.8	40
30	68 47.0	96.5	69 01.1	93.8	69 13.0	91.0	69 21.7	88.2	69 28.0	85.4	30
20	71 02.9	98.3	71 17.8	95.3	71 29.9	92.1	71 38.9	89.1	71 44.7	85.9	20
10	73 18.2	100.4	73 34.2	97.1	73 46.7	93.5	73 55.7	90.0	74 01.2	86.4	10
1 00	75 32.3	103.1	75 49.6	99.3	76 03.3	95.2	76 12.9	91.1	76 18.3	86.9	1 00
0 50	77 44.5	106.6	78 04.2	102.1	78 19.5	97.3	78 29.5	92.5	78 35.0	87.5	0 50
40	79 54.4	111.3	80 17.4	106.0	80 35.0	100.3	80 46.6	94.2	80 52.0	88.0	40
30	81 59.0	118.4	82 26.5	112.0	82 48.5	104.7	83 02.5	96.7	83 09.0	88.5	30
20	83 52.7	129.8	84 29.6	122.0	84 58.9	112.5	85 18.5	101.4	85 25.9	89.0	20
10	85 22.6	149.4	86 12.8	141.9	86 57.1	130.6	87 30.0	113.9	87 43.0	89.5	10
0 00	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	90 0.0	Ind.	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 17.0	91.0	1 52.6	91.9	1 28.1	92.8	1 03.7	93.8	0 39.1	94.7	5 50
40	4 34.0	92.0	4 09.5	93.0	3 44.9	93.9	3 20.3	94.8	2 55.6	95.7	40
30	6 50.9	93.1	6 26.2	94.0	6 01.5	94.9	5 36.8	95.8	5 11.8	96.7	30
20	9 07.7	94.1	8 42.8	95.0	8 17.9	95.9	7 52.9	96.9	7 27.8	97.8	20
10	11 24.2	95.2	10 59.2	96.1	10 34.1	97.0	10 08.2	98.0	9 43.3	98.9	10
5 00	13 40.6	96.2	13 15.4	97.2	12 49.9	98.1	12 24.8	99.0	11 58.5	99.9	5 00
4 50	15 56.7	97.3	15 31.2	98.3	15 05.4	99.2	14 39.5	100.1	14 13.2	101.1	4 50
40	18 12.4	98.4	17 46.6	99.4	17 20.5	100.3	16 54.1	101.2	16 27.5	102.2	40
30	20 27.8	99.6	20 01.5	100.6	19 35.0	101.5	19 08.2	102.4	18 41.2	103.4	30
20	22 42.6	100.8	22 16.0	101.7	21 49.0	102.7	21 21.8	103.6	20 54.2	104.6	20
10	24 57.0	102.0	24 29.9	102.9	24 02.3	103.9	23 34.6	104.9	23 06.3	105.8	10
4 00	27 10.7	103.2	26 43.1	104.2	26 15.0	105.2	25 46.6	106.2	25 17.7	107.1	4 00
3 50	29 23.8	104.5	28 55.6	105.5	28 26.9	106.5	27 57.7	107.5	27 28.2	108.5	3 50
40	31 36.0	105.9	31 07.1	106.9	30 37.7	108.0	30 07.9	109.0	29 37.6	110.0	40
30	33 47.3	107.3	33 17.7	108.3	32 47.6	109.4	32 16.9	110.4	31 45.8	111.5	30
20	35 57.6	108.8	35 27.1	109.9	34 56.1	111.0	34 24.6	112.0	33 52.7	113.0	20
10	38 06.6	110.5	37 35.2	111.5	37 02.8	112.6	36 30.9	113.6	35 57.9	114.7	10
3 00	40 14.4	112.1	39 42.0	113.2	39 09.1	114.3	38 35.6	115.4	38 01.6	116.5	3 00
2 50	42 20.4	113.9	41 47.0	115.0	41 13.1	116.1	40 38.5	117.2	40 03.2	118.3	2 50
40	44 24.7	115.9	43 50.2	117.0	43 14.9	118.1	42 39.2	119.2	42 02.8	120.3	40
30	46 26.8	117.9	45 51.2	119.0	45 14.8	120.2	44 37.6	121.3	43 59.8	122.4	30
20	48 26.8	120.2	47 49.6	121.3	47 11.6	122.5	46 33.2	123.6	46 54.1	124.7	20
10	50 23.8	122.6	49 45.1	123.8	49 05.8	124.9	48 25.7	126.0	47 45.0	127.1	10
2 00	52 17.6	125.2	51 37.3	126.4	50 56.3	127.5	50 14.7	128.7	49 32.4	129.8	2 00
1 50	54 07.6	128.0	53 25.6	129.2	52 43.0	130.4	51 59.5	131.5	51 15.5	132.6	1 50
40	55 53.3	131.1	55 09.4	132.3	54 24.8	133.5	53 39.7	134.6	52 53.9	135.7	40
30	57 33.8	134.5	56 48.1	135.7	56 01.6	136.8	55 14.5	137.9	54 26.9	139.0	30
20	59 08.6	138.2	58 20.7	139.3	57 32.1	140.4	56 43.1	141.5	55 53.6	142.5	20
10	60 36.2	142.2	59 46.2	143.3	58 55.8	144.4	58 04.8	145.4	57 13.2	146.3	10
1 00	61 56.1	146.6	61 03.9	147.6	60 11.4	148.6	59 18.5	149.6	58 25.1	150.5	1 00
0 50	63 06.7	151.4	62 12.5	152.4	61 18.1	153.3	60 23.2	154.1	59 27.9	154.9	0 50
40	64 06.8	156.6	63 10.7	157.4	62 14.4	158.1	61 18.0	158.8	60 21.3	159.5	40
30	64 55.3	162.1	63 57.5	162.7	62 59.8	163.3	62 01.8	163.9	61 03.8	164.4	30
20	65 30.9	167.9	64 31.9	168.3	63 32.9	168.7	62 33.9	169.1	61 34.9	169.5	20
10	65 52.7	173.9	64 53.0	174.1	63 53.2	174.3	62 53.5	174.5	61 53.7	174.7	10
0 00	66 0.0	180.0	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 14.6	95.6									5 50
40	2 30.9	96.6	2 06.1	97.5	1 41.3	98.4	1 16.4	99.3	0 51.6	100.3	40
30	4 46.8	97.6	4 21.8	98.6	3 56.6	99.5	3 31.4	100.4	3 06.2	101.3	30
20	7 02.5	98.7	6 37.1	99.6	6 11.6	100.5	5 46.0	101.4	5 20.3	102.3	20
10	9 17.8	99.8	8 51.9	100.7	8 26.1	101.6	8 00.1	102.5	7 34.0	103.4	10
5 00	11 32.6	100.9	11 06.4	101.8	10 40.1	102.7	10 13.6	103.6	9 47.0	104.5	5 00
4 50	13 46.9	102.0	13 20.3	102.9	12 53.5	103.8	12 26.4	104.7	11 59.3	105.6	4 50
40	16 00.7	103.1	15 33.5	104.0	15 06.2	105.0	14 38.6	105.9	14 10.8	106.8	40
30	18 13.8	104.3	17 46.1	105.2	17 18.2	106.2	16 50.0	107.1	16 21.6	108.0	30
20	20 26.2	105.5	19 58.0	106.5	19 29.4	107.4	19 00.5	108.3	18 31.4	109.3	20
10	22 37.8	106.8	22 08.9	107.8	21 39.6	108.7	21 10.1	109.7	20 40.3	110.6	10
4 00	24 48.5	108.1	24 19.0	109.1	23 49.0	110.0	23 18.7	111.0	22 48.0	111.9	4 00
3 50	26 58.2	109.5	26 27.8	110.5	25 57.2	111.4	25 26.0	112.4	24 54.5	113.3	3 50
40	29 06.8	110.9	28 35.7	111.9	28 04.0	112.9	27 32.1	113.8	26 59.7	114.8	40
30	31 14.2	112.4	30 42.1	113.4	30 09.6	114.4	29 36.6	115.4	29 03.4	116.4	30
20	33 20.1	114.0	32 47.1	115.0	32 13.6	116.0	31 39.6	117.0	31 05.3	118.0	20
10	34 24.5	115.7	34 50.4	116.7	34 15.9	117.7	33 40.8	118.7	33 05.5	119.7	10
3 00	37 27.0	117.5	36 51.9	118.5	36 16.2	119.5	35 40.0	120.5	35 03.5	121.4	3 00
2 50	39 27.5	119.3	38 51.2	120.4	38 14.4	121.4	37 37.0	122.4	36 59.3	123.3	2 50
40	41 25.9	121.3	40 48.3	122.4	40 10.1	123.4	39 31.4	124.4	38 52.3	125.3	40
30	43 21.5	123.4	42 42.6	124.5	42 03.1	125.5	41 23.0	126.6	40 42.5	127.5	30
20	45 14.3	125.7	44 33.9	126.8	43 52.9	127.8	43 11.5	128.9	42 29.5	129.8	20
10	47 03.8	128.2	46 21.8	129.3	45 39.4	130.3	44 56.4	131.3	44 13.0	132.2	10
2 00	48 49.5	130.9	48 06.0	131.9	47 21.9	132.9	46 37.3	133.9	45 52.3	134.8	2 00
1 50	50 31.0	133.7	49 45.7	134.7	49 00.0	135.7	48 13.8	136.7	47 27.2	137.6	1 50
40	52 07.6	136.7	51 20.6	137.7	50 33.2	138.7	49 45.3	139.6	48 57.0	140.5	40
30	53 38.8	140.0	52 49.9	140.9	52 00.8	141.9	51 11.1	142.8	50 21.2	143.7	30
20	55 03.5	143.5	54 13.0	144.4	53 22.1	145.3	52 30.8	146.2	51 39.1	147.0	20
10	56 21.4	147.3	55 29.0	148.2	54 36.5	149.0	53 43.4	149.8	52 50.2	150.6	10
1 00	57 31.5	151.3	56 37.4	152.1	55 43.0	152.9	54 48.4	153.6	53 53.6	154.3	1 00
0 50	58 32.6	155.6	57 37.0	156.3	56 41.1	157.0	55 45.1	157.6	54 48.8	158.2	0 50
40	59 24.4	160.1	58 27.3	160.7	57 30.1	161.3	56 32.6	161.8	55 35.1	162.3	40
30	60 05.5	164.9	59 07.1	165.3	58 08.8	165.8	57 10.3	166.2	56 11.9	166.6	30
20	60 35.7	169.8	59 36.5	170.2	58 37.1	170.5	57 37.8	170.7	56 38.4	171.0	20
10	60 53.9	174.8	59 54.1	175.0	58 54.3	175.2	57 54.5	175.3	56 54.6	175.5	10
0 00	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 26.8	101.2	0 01.9	102.1							5 40
30	2 40.9	102.2	2 15.6	103.1	1 50.3	104.0	1 24.8	104.9	0 59.7	105.8	30
20	4 54.6	103.3	4 28.8	104.2	4 03.0	105.1	3 37.0	106.0	3 11.0	106.9	20
10	7 07.8	104.3	6 41.4	105.2	6 15.0	106.1	5 48.4	107.0	5 21.8	107.9	10
5 00	9 20.2	105.4	8 53.2	106.3	8 26.2	107.2	7 59.0	108.1	7 31.7	109.0	5 00
4 50	11 31.9	106.5	11 04.4	107.5	10 36.7	108.4	10 08.9	109.3	9 40.8	110.2	4 50
40	13 42.9	107.7	13 14.7	108.6	12 46.3	109.5	12 17.7	110.4	11 49.0	111.3	40
30	15 52.9	108.9	15 24.0	109.8	14 54.9	110.7	14 25.7	111.6	13 56.1	112.5	30
20	18 02.1	110.2	17 32.5	111.1	17 02.5	112.0	16 32.4	112.9	16 02.0	113.8	20
10	20 10.1	111.5	19 39.7	112.4	19 09.0	113.3	18 38.0	114.2	18 06.9	115.1	10
4 00	22 17.1	112.8	21 45.8	113.8	21 14.2	114.7	20 42.3	115.6	20 10.3	116.5	4 00
3 50	24 22.8	114.2	23 50.6	115.2	23 18.1	116.1	22 45.2	117.0	22 12.1	117.9	3 50
40	26 27.0	115.7	25 53.8	116.6	25 20.4	117.6	24 46.5	118.5	24 12.4	119.4	40
30	28 29.5	117.3	27 55.5	118.2	27 21.0	119.1	26 46.1	120.0	26 10.9	120.9	30
20	30 30.5	118.9	29 55.3	119.8	29 19.7	120.8	28 43.7	121.7	28 07.4	122.6	20
10	32 29.5	120.6	31 53.2	121.5	31 16.5	122.5	30 39.7	123.4	30 01.8	124.3	10
3 00	34 26.4	122.4	33 48.8	123.3	33 10.9	124.3	32 32.5	125.2	31 53.8	126.1	3 00
2 50	36 20.8	124.3	35 42.1	125.3	35 02.8	126.2	34 23.2	127.1	33 43.4	128.0	2 50
40	38 12.7	126.3	37 32.5	127.3	36 52.1	128.2	36 11.0	129.1	35 29.7	130.0	40
30	40 01.5	128.5	39 20.0	129.5	38 38.1	130.4	37 55.8	131.2	37 12.0	132.1	30
20	41 47.1	130.8	41 04.2	131.7	40 20.8	132.6	39 37.0	133.5	38 52.9	134.4	20
10	43 29.0	133.2	42 44.6	134.1	41 59.7	135.0	41 14.5	135.9	40 28.9	136.7	10
2 00	45 06.9	135.8	44 20.9	136.7	43 34.5	137.6	42 47.7	138.4	42 00.6	139.2	2 00
1 50	46 40.0	138.5	45 52.5	139.4	45 04.6	140.3	44 46.4	141.1	44 27.7	141.9	1 50
40	48 08.3	141.4	47 19.1	142.3	46 29.6	143.1	45 39.7	143.9	44 49.6	144.7	40
30	49 30.8	144.5	48 40.1	145.3	47 49.0	146.1	46 57.7	146.9	46 05.9	147.6	30
20	50 47.2	147.8	49 54.8	148.6	49 02.3	149.3	48 09.3	150.0	47 16.2	150.7	20
10	51 56.6	151.3	51 02.7	152.0	50 08.7	152.7	49 14.4	153.3	48 19.9	154.0	10
1 00	52 58.5	155.0	52 03.3	155.6	51 07.8	156.2	50 12.1	156.8	49 16.3	157.4	1 00
0 50	53 52.4	158.8	52 55.8	159.4	51 59.0	159.9	51 02.1	160.4	50 05.1	160.9	0 50
40	54 37.6	162.8	53 39.7	163.3	52 41.9	163.7	51 43.9	164.2	50 45.9	164.6	40
30	55 13.1	167.0	54 14.6	167.3	53 15.6	167.7	52 16.9	168.0	51 18.0	168.3	30
20	55 39.1	171.3	54 39.6	171.5	53 40.3	171.7	52 40.7	172.0	51 41.3	172.2	20
10	55 54.8	175.6	54 54.9	175.7	53 55.1	175.9	52 55.2	176.0	51 55.3	176.1	10
0 00	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 34.1	106.7	0 08.6	107.6							5 30
20	2 44.9	107.8	2 18.8	108.7	1 52.7	109.6	1 26.5	110.5	1 00.4	111.4	20
10	4 55.1	108.8	4 28.2	109.7	4 01.4	110.6	3 34.5	111.5	3 07.6	112.4	10
5 00	7 04.3	109.9	6 36.8	110.8	6 09.2	111.7	5 41.5	112.6	5 13.7	113.5	5 00
4 50	9 12.7	111.1	8 44.6	112.0	8 16.0	112.8	7 47.4	113.7	7 18.9	114.6	4 50
40	11 20.0	112.2	10 51.0	113.1	10 21.7	114.0	9 52.4	114.9	9 22.8	115.8	40
30	13 26.3	113.4	12 56.4	114.3	12 26.4	115.2	11 56.0	116.1	11 25.7	117.0	30
20	15 31.5	114.7	15 00.7	115.6	14 29.6	116.5	13 58.5	117.4	13 27.1	118.2	20
10	17 35.4	116.0	17 03.6	116.9	16 31.6	117.8	15 59.4	118.7	15 27.1	119.5	10
4 00	19 37.8	117.4	19 05.1	118.3	18 32.1	119.1	17 58.9	120.0	17 25.5	120.9	4 00
3 50	21 38.7	118.8	21 05.0	119.7	20 30.9	120.5	19 56.7	121.4	19 22.2	122.3	3 50
40	23 37.9	120.3	23 03.1	121.2	22 28.1	122.0	21 52.7	122.9	21 17.1	123.8	40
30	25 35.4	121.8	24 59.5	122.7	24 23.2	123.6	23 46.8	124.5	23 10.1	125.4	30
20	27 30.7	123.5	26 53.7	124.4	26 16.3	125.2	25 38.7	126.1	25 00.7	126.9	20
10	29 23.8	125.2	28 45.7	126.1	28 07.1	126.9	27 28.1	127.8	26 49.1	128.6	10
3 00	31 14.7	127.0	30 35.2	127.9	29 55.3	128.7	29 15.2	129.6	28 34.7	130.4	3 00
2 50	33 02.8	128.9	32 21.9	129.8	31 40.8	130.6	30 59.3	131.4	30 17.6	132.2	2 50
40	34 47.9	130.9	34 05.8	131.8	33 23.3	132.6	32 40.4	133.4	31 57.4	134.2	40
30	36 29.8	133.0	35 46.3	133.9	35 02.3	134.7	34 18.3	135.5	33 33.8	136.3	30
20	38 08.3	135.2	37 23.3	136.1	36 38.1	136.9	35 52.5	137.7	35 06.6	138.5	20
10	39 42.8	137.5	38 56.5	138.4	38 09.7	139.2	37 22.7	140.0	36 35.4	140.8	10
2 00	41 13.1	140.0	40 25.2	140.9	39 37.1	141.6	38 48.6	142.4	37 59.8	143.2	2 00
1 50	42 38.7	142.7	41 49.3	143.5	40 59.7	144.2	40 09.8	144.9	39 19.7	145.7	1 50
40	43 59.1	145.4	43 08.3	146.2	42 17.2	146.9	41 25.9	147.6	40 34.4	148.3	40
30	45 13.9	148.3	44 21.8	149.0	43 29.2	149.7	42 36.6	150.4	41 43.8	151.0	30
20	46 22.8	151.4	45 29.2	152.0	44 35.3	152.7	43 41.3	153.3	42 47.2	153.9	20
10	47 25.0	154.7	46 30.1	155.2	45 35.0	155.8	44 39.7	156.3	43 44.4	156.8	10
1 00	48 20.3	157.9	47 24.1	158.4	46 27.8	158.9	45 31.4	159.4	44 34.8	159.9	1 00
0 50	49 07.9	161.4	48 10.7	161.8	47 13.4	162.3	46 16.0	162.7	45 18.4	163.1	0 50
40	49 47.6	165.0	48 49.5	165.3	47 51.2	165.7	46 52.9	166.0	45 54.5	166.4	40
30	50 19.1	168.6	49 20.1	168.9	48 21.0	169.2	47 22.0	169.4	46 23.0	169.7	30
20	50 41.7	172.4	49 42.2	172.6	48 42.6	172.7	47 43.0	172.9	46 43.4	173.1	20
10	50 55.4	176.2	49 55.6	176.3	48 55.7	176.4	47 55.8	176.5	46 55.9	176.5	10
0 00	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 34.2	112.3	0 08.0	113.2							5 20
10	2 40.6	113.3	2 13.5	114.2	1 46.4	115.1	1 19.3	116.0	0 52.3	116.9	10
5 00	4 45.9	114.4	4 18.0	115.3	3 50.0	116.2	3 22.0	117.1	2 53.9	117.9	5 00
4 50	6 50.2	115.5	6 21.3	116.4	5 52.4	117.3	5 23.4	118.2	4 54.4	119.0	4 50
40	8 53.2	116.7	8 23.5	117.5	7 53.6	118.4	7 23.6	119.3	6 53.6	120.1	40
30	10 55.1	117.9	10 24.3	118.7	9 53.5	119.6	9 22.4	120.5	8 51.3	121.3	30
20	12 55.5	119.1	12 23.7	119.9	11 51.9	120.8	11 19.8	121.7	10 47.6	122.6	20
10	14 54.5	120.4	14 21.7	121.2	13 48.8	122.1	13 15.6	123.0	12 42.3	123.9	10
4 00	16 51.9	121.8	16 18.0	122.6	15 44.0	123.5	15 09.7	124.3	14 35.3	125.2	4 00
3 50	18 47.6	123.2	18 12.5	124.0	17 37.3	124.9	17 02.2	125.7	16 26.3	126.6	3 50
40	20 41.2	124.6	20 05.1	125.4	19 28.8	126.3	18 52.2	127.2	18 15.3	128.0	40
30	22 33.0	126.2	21 55.7	127.0	21 18.0	127.9	20 40.2	128.7	20 02.2	129.5	30
20	24 22.4	127.8	23 43.8	128.6	23 05.1	129.5	22 26.0	130.3	21 46.7	131.1	20
10	26 09.4	129.5	25 29.7	130.3	24 49.6	131.1	24 09.2	131.9	23 28.7	132.8	10
3 00	27 53.8	131.3	27 12.8	132.1	26 31.5	132.9	25 49.8	133.7	25 07.9	134.5	3 00
2 50	29 35.4	133.1	28 53.0	133.9	28 10.3	134.7	27 27.3	135.5	16 44.2	136.3	2 50
40	31 13.9	135.1	30 30.1	135.9	29 46.1	136.6	29 01.8	137.4	28 17.2	138.2	40
30	32 48.9	137.1	32 03.8	137.9	31 18.4	138.6	30 32.7	139.4	29 46.8	140.2	30
20	34 20.3	139.3	33 33.8	140.0	32 47.1	140.8	32 00.0	141.5	31 12.7	142.2	20
10	35 47.7	141.5	34 59.8	142.2	34 11.7	143.0	33 23.2	143.7	32 34.7	144.4	10
2 00	37 10.8	143.9	36 21.5	144.6	35 32.1	145.3	34 42.3	146.0	33 52.3	146.6	2 00
1 50	38 29.2	146.3	37 38.6	147.0	36 47.7	147.7	35 56.6	148.4	35 05.3	149.0	1 50
40	39 42.6	148.9	38 50.6	149.6	37 58.5	150.2	37 06.1	150.8	36 13.5	151.4	40
30	40 50.6	151.6	39 57.2	152.2	39 03.8	152.8	38 10.1	153.4	37 16.3	154.0	30
20	41 52.8	154.4	40 58.2	155.0	40 03.6	155.5	39 08.7	156.1	38 13.7	156.6	20
10	42 48.8	157.3	41 53.1	157.8	40 57.2	158.3	40 01.3	158.8	39 05.2	159.3	10
1 00	43 38.2	160.4	42 41.4	160.8	41 44.6	161.2	40 47.7	161.7	39 50.6	162.1	1 00
0 50	44 20.7	163.5	43 23.0	163.9	42 25.2	164.2	41 27.4	164.6	40 29.6	164.9	0 50
40	44 56.0	166.7	43 57.5	167.0	42 59.1	167.3	42 00.5	167.6	41 01.8	167.9	40
30	45 23.9	170.0	44 24.7	170.2	43 25.5	170.4	42 26.3	170.6	41 27.2	170.9	30
20	45 43.8	173.3	44 44.3	173.4	43 44.7	173.6	42 45.0	173.7	41 45.4	173.9	20
10	45 56.0	176.6	44 56.1	176.7	43 56.2	176.8	42 56.2	176.8	41 56.3	176.9	10
0 00	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0	0 25. 3	89. 1	0 50. 7	88. 2	1 16. 0	87 3	1 41. 3	86. 4	6 00
5 50	2 16. 0	91. 0	2 41. 3	90. 1	3 06. 5	89. 2	3 31. 9	88. 3	3 57. 1	87. 4	5 50
40	4 31. 8	92. 1	4 57. 2	91. 2	5 22. 6	90. 3	5 47. 8	89. 4	6 13. 0	88. 5	40
30	6 47. 7	93. 2	7 13. 1	92. 3	7 38. 4	91. 4	8 03. 8	90. 5	8 28. 9	89. 5	30
20	9 03. 3	94. 3	9 28. 9	93. 4	9 54. 3	92. 4	10 19. 6	91. 5	10 44. 9	90. 6	20
10	11 18. 8	95. 4	11 44. 5	94. 4	12 10. 0	93. 5	12 35. 5	92. 6	13 00. 8	91. 7	10
5 00	13 34. 1	96. 5	13 59. 9	95. 5	14 25. 7	94. 6	14 51. 2	93. 7	15 16. 6	92. 7	5 00
4 50	15 48. 9	97. 6	16 15. 1	96. 7	16 41. 1	95. 7	17 06. 9	94. 8	17 32. 3	93. 8	4 50
40	18 03. 5	98. 7	18 30. 0	97. 8	18 56. 2	96. 9	19 22. 2	95. 9	19 47. 9	94. 9	40
30	20 17. 6	99. 9	20 44. 0	99. 0	21 11. 0	98. 0	21 37. 2	97. 1	22 03. 2	96. 1	30
20	22 31. 3	101. 0	22 58. 5	100. 2	23 25. 4	99. 2	23 52. 0	98. 3	24 18. 2	97. 3	20
10	24 44. 4	102. 4	25 12. 1	101. 4	25 39. 6	100. 5	26 06. 3	99. 5	26 32. 8	98. 5	10
4 00	26 56. 8	103. 7	27 25. 0	102. 7	27 52. 8	101. 7	28 20. 1	100. 7	28 47. 1	99. 7	4 00
3 50	29 08. 5	105. 1	29 37. 2	104. 1	30 05. 6	103. 0	30 33. 5	102. 0	31 00. 8	101. 0	3 50
40	31 19. 3	106. 5	31 48. 7	105. 5	32 17. 6	104. 4	32 46. 1	103. 4	33 14. 0	102. 3	40
30	33 29. 1	108. 0	33 59. 2	106. 9	34 28. 8	105. 9	34 57. 9	104. 8	35 26. 4	103. 7	30
20	35 37. 9	109. 5	36 08. 8	108. 5	36 39. 1	107. 4	37 08. 9	106. 3	37 38. 1	105. 2	20
10	37 45. 2	111. 2	38 17. 0	110. 1	38 48. 2	109. 0	39 18. 8	107. 9	39 48. 8	106. 8	10
3 00	39 51. 4	112. 9	40 24. 1	111. 8	40 56. 1	110. 7	41 27. 5	109. 6	41 58. 4	108. 4	3 00
2 50	41 55. 6	114. 7	42 29. 4	113. 6	43 02. 5	112. 5	43 35. 0	111. 4	44 06. 8	110. 2	2 50
40	43 58. 2	116. 7	44 33. 0	115. 6	45 07. 2	114. 4	45 40. 7	113. 3	46 13. 5	112. 1	40
30	45 58. 4	118. 8	46 34. 5	117. 7	47 09. 9	116. 5	47 44. 8	115. 3	48 18. 5	114. 1	30
20	47 56. 2	121. 1	48 33. 7	120. 0	49 10. 4	118. 7	49 46. 4	117. 5	50 21. 6	116. 2	20
10	49 51. 0	123. 6	50 30. 0	122. 4	51 08. 2	121. 2	51 45. 6	119. 9	52 22. 2	118. 6	10
2 00	51 42. 6	126. 2	52 23. 1	125. 0	53 02. 9	123. 8	53 42. 0	122. 5	54 20. 2	121. 2	2 00
1 50	53 30. 2	129. 1	54 12. 6	127. 9	54 54. 1	126. 6	55 34. 9	125. 3	56 14. 8	124. 0	1 50
40	55 13. 5	132. 2	55 57. 5	131. 0	56 41. 0	129. 8	57 23. 5	128. 5	58 05. 3	127. 1	40
30	56 51. 4	135. 6	57 37. 5	134. 4	58 22. 9	133. 2	59 07. 5	131. 9	59 51. 4	130. 5	30
20	58 23. 5	139. 3	59 11. 6	138. 1	59 59. 0	136. 9	60 45. 7	135. 6	61 31. 7	134. 3	20
10	59 48. 4	143. 3	60 38. 8	142. 2	61 28. 2	141. 0	62 17. 2	139. 8	63 05. 5	138. 5	10
1 00	61 05. 7	147. 6	61 58. 0	146. 6	62 49. 7	145. 5	63 40. 8	144. 3	64 31. 5	143. 1	1 00
0 50	62 13. 8	152. 3	63 08. 0	151. 4	64 02. 0	150. 4	64 55. 2	149. 4	65 48. 2	148. 2	0 50
40	63 11. 6	157. 4	64 07. 7	156. 6	65 03. 5	155. 7	65 59. 1	154. 8	66 54. 2	153. 8	40
30	63 58. 1	162. 7	64 55. 8	162. 1	65 53. 4	161. 4	66 50. 6	160. 6	67 47. 8	159. 8	30
20	64 32. 2	168. 3	65 31. 0	167. 9	66 29. 9	167. 4	67 28. 6	166. 9	68 27. 5	166. 3	20
10	64 53. 0	174. 1	65 52. 8	173. 9	66 52. 5	173. 6	67 52. 1	173. 4	68 51. 8	173. 2	10
0 00	65 0. 0	180. 0	66 0. 0	180. 0	67 0. 0	180. 0	68 0. 0	180. 0	69 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 16.7	83.5	0 42.2	82.6	1 07.7	81.7	1 33.1	80.8	6 10
6 00	2 06.7	85.5	2 31.9	84.6	2 57.2	83.7	3 22.2	82.7	3 47.4	81.9	6 00
5 50	4 22.2	86.5	4 47.3	85.6	5 12.4	84.7	5 37.3	83.8	6 02.1	82.9	5 50
40	6 38.0	87.6	7 03.0	86.7	7 27.9	85.7	7 52.5	84.8	8 17.2	83.9	40
30	8 53.9	88.6	9 18.8	87.7	9 43.4	86.8	10 08.1	85.8	10 32.5	84.9	30
20	11 09.8	89.7	11 34.6	88.7	11 59.4	87.8	12 23.7	86.9	12 48.0	85.9	20
10	13 25.8	90.8	13 50.6	89.8	14 15.2	88.8	14 39.6	87.9	15 03.6	86.9	10
5 00	15 41.7	91.8	16 06.6	90.8	16 31.2	89.9	16 55.4	88.9	17 19.5	88.0	5 00
4 50	17 57.5	92.9	18 22.4	91.9	18 47.0	91.0	19 11.4	90.0	19 35.3	89.0	4 50
40	20 13.2	94.0	20 38.3	93.0	21 03.0	92.0	21 27.2	91.1	21 51.3	90.1	40
30	22 28.8	95.1	22 53.9	94.1	23 18.8	93.1	23 43.3	92.1	24 07.2	91.1	30
20	24 44.0	96.3	25 09.4	95.3	25 34.5	94.3	25 58.9	93.2	26 23.1	92.2	20
10	26 59.0	97.5	27 24.7	96.4	27 49.8	95.4	28 14.5	94.3	28 38.9	93.3	10
4 00	29 13.6	98.7	29 39.6	97.6	30 05.2	96.6	30 30.0	95.5	30 54.6	94.5	4 00
3 50	31 27.8	100.0	31 54.2	98.9	32 20.0	97.8	32 45.2	96.7	33 10.0	95.7	3 50
40	33 41.4	101.3	34 08.2	100.2	34 34.5	99.1	35 00.0	98.0	35 25.1	96.9	40
30	35 54.3	102.6	36 21.7	101.5	36 48.5	100.4	37 14.5	99.3	37 39.9	98.2	30
20	38 06.6	104.1	38 34.5	102.9	39 01.8	101.8	39 28.3	100.7	39 54.2	99.5	20
10	40 18.1	105.7	40 46.6	104.5	41 14.5	103.3	41 41.7	102.1	42 08.6	100.9	10
3 00	42 28.4	107.3	42 57.8	106.1	43 26.4	104.9	43 54.1	103.6	44 21.1	102.4	3 00
2 50	44 37.6	109.0	45 07.8	107.8	45 37.2	106.5	46 05.8	105.3	46 33.5	104.0	2 50
40	46 45.5	110.8	47 16.7	109.6	47 47.1	108.3	48 16.4	107.0	48 45.0	105.7	40
30	48 51.7	112.8	49 23.9	111.5	49 55.4	110.2	50 25.8	108.9	50 55.3	107.5	30
20	50 55.9	114.9	51 29.5	113.6	52 02.1	112.3	52 33.5	110.9	53 04.1	109.5	20
10	52 58.1	117.2	53 32.9	115.9	54 06.7	114.5	54 39.6	113.1	55 11.6	111.6	10
2 00	54 57.5	119.8	55 33.9	118.4	56 09.4	117.0	56 43.5	115.5	57 16.7	114.0	2 00
1 50	56 53.8	122.6	57 31.9	121.2	58 08.9	119.7	58 44.9	118.2	59 19.9	116.6	1 50
40	58 46.2	125.7	59 26.3	124.3	60 05.3	122.7	60 43.0	121.1	61 19.7	119.5	40
30	60 34.4	129.1	61 16.4	127.7	61 57.3	126.1	62 37.3	124.5	63 16.1	122.8	30
20	62 16.8	132.9	63 01.2	131.4	63 44.7	129.9	64 26.6	128.3	65 07.8	126.5	20
10	63 53.2	137.1	64 39.8	135.6	65 25.5	134.1	66 10.4	132.5	66 54.2	130.8	10
1 00	65 21.5	141.8	66 10.7	140.4	66 59.4	138.9	67 46.5	137.3	68 33.0	135.6	1 00
0 50	66 40.8	147.0	67 32.4	145.7	68 23.7	144.3	69 13.8	142.8	70 03.5	141.2	0 50
40	67 48.9	152.7	68 43.3	151.6	69 37.1	150.3	70 30.2	149.0	71 22.8	147.5	40
30	68 44.8	159.0	69 41.2	158.1	70 37.4	157.0	71 33.2	155.9	72 28.8	154.6	30
20	69 26.0	165.7	70 24.3	165.0	71 22.7	164.3	72 20.5	163.5	73 18.3	162.5	20
10	69 51.4	172.8	70 51.0	172.4	71 50.6	172.0	72 50.1	171.6	73 49.4	171.1	10
0 00	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20			0 10.6	77.9	0 36.4	77.0	1 02.3	76.1	1 28.1	75.2	6 20
10	1 58.4	79.9	2 23.8	79.0	2 49.2	78.1	3 14.5	77.2	3 39.7	76.3	10
6 00	4 12.5	80.9	4 37.6	80.0	5 02.5	79.1	5 27.3	78.2	5 52.1	77.3	6 00
5 50	6 26.9	82.0	6 51.6	81.1	7 16.2	80.1	7 40.6	79.2	8 04.8	78.3	5 50
40	8 41.8	83.0	9 06.1	82.1	9 30.3	81.1	9 54.3	80.2	10 18.2	79.3	40
30	10 56.7	84.0	11 20.8	83.1	11 44.7	82.1	12 08.5	81.2	12 32.0	80.2	30
20	13 12.1	85.0	13 36.0	84.1	13 59.6	83.1	14 23.0	82.2	14 46.2	81.2	20
10	15 27.7	86.0	15 51.6	85.1	16 14.6	84.1	16 37.8	83.1	17 00.8	82.2	10
5 00	17 43.3	87.0	18 06.9	86.1	18 30.0	85.1	18 53.0	84.1	19 15.5	83.1	5 00
4 50	19 59.1	88.0	20 22.4	87.1	20 45.5	86.1	21 08.2	85.1	21 30.7	84.1	4 50
40	22 15.0	89.1	22 38.4	88.1	23 01.3	87.1	23 23.8	86.1	23 46.0	85.1	40
30	24 30.9	90.1	24 54.2	89.1	25 17.1	88.1	25 39.5	87.1	26 01.5	86.1	30
20	26 46.9	91.2	27 10.2	90.2	27 33.0	89.1	27 55.3	88.1	28 17.2	87.0	20
10	29 02.7	92.3	29 26.1	91.2	29 48.8	90.2	30 11.1	89.1	30 33.0	88.0	10
4 00	31 18.6	93.4	31 42.1	92.3	32 04.9	91.2	32 27.2	90.1	32 48.9	89.0	4 00
3 50	33 34.2	94.6	33 57.8	93.5	34 20.8	92.3	34 43.0	91.2	35 04.8	90.1	3 50
40	35 49.6	95.8	36 13.5	94.6	36 36.5	93.5	36 59.0	92.3	37 20.8	91.2	40
30	38 04.7	97.0	38 28.8	95.8	38 52.1	94.7	39 14.8	93.5	39 36.6	92.3	30
20	40 19.4	98.3	40 43.9	97.1	41 07.5	95.9	41 30.4	94.7	41 52.4	93.4	20
10	42 33.6	99.7	42 58.5	98.4	43 22.5	97.2	43 45.6	95.9	44 08.0	94.6	10
3 00	44 47.4	101.1	45 12.9	99.8	45 37.2	98.5	46 00.9	97.2	46 23.4	95.9	3 00
2 50	47 00.3	102.7	47 26.3	101.3	47 51.3	100.0	48 15.4	98.6	48 38.4	97.2	2 50
40	49 12.6	104.3	49 39.4	102.9	50 05.0	101.5	50 29.7	100.1	50 53.0	98.7	40
30	51 23.8	106.1	51 51.3	104.7	52 17.7	103.2	52 43.1	101.7	53 07.2	100.2	30
20	53 33.8	108.0	54 02.4	106.5	54 29.6	105.0	54 55.8	103.4	55 20.6	101.8	20
10	55 42.3	110.1	56 11.9	108.5	56 40.3	107.0	57 07.4	105.3	57 33.4	103.6	10
2 00	57 49.0	112.4	58 20.1	110.8	58 49.7	109.1	59 17.9	107.4	59 44.8	105.6	2 00
1 50	59 53.4	114.9	60 26.0	113.3	60 57.0	111.5	61 26.8	109.7	61 55.0	107.9	1 50
40	61 55.2	117.8	62 29.7	116.1	63 02.4	114.3	63 33.7	112.4	64 03.3	110.4	40
30	63 53.7	121.1	64 30.0	119.2	65 04.7	117.3	65 38.0	115.4	66 09.6	113.3	30
20	65 47.8	124.7	66 26.6	122.8	67 03.6	120.9	67 39.1	118.8	68 12.9	116.6	20
10	67 36.7	129.0	68 17.8	127.0	68 57.5	125.0	69 35.8	122.8	70 12.5	120.5	10
1 00	69 18.7	133.8	70 03.1	131.9	70 46.0	129.8	71 27.1	127.5	72 06.7	125.2	1 00
0 50	70 52.0	139.4	71 39.5	137.5	72 25.7	135.5	73 10.5	133.2	73 54.0	130.8	0 50
40	72 14.8	145.9	73 05.8	144.1	73 55.6	142.2	74 44.4	140.0	75 31.4	137.6	40
30	73 23.5	153.3	74 17.7	151.7	75 11.5	150.0	76 04.0	148.1	76 56.0	145.9	30
20	74 15.9	161.5	75 13.5	160.4	76 10.1	159.1	77 06.6	157.6	78 02.2	155.9	20
10	74 48.8	170.6	75 48.0	170.0	76 47.2	169.2	77 46.2	168.4	78 45.1	167.5	10
0 00	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′		° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30			0 09. 5	72. 4	0 35. 8	71. 5	1 02. 1	70. 6	1 28. 5	69. 7	6 30
20	1 53. 8	74. 3	2 19. 5	73. 4	2 45. 2	72. 5	3 10. 8	71. 6	3 36. 4	70. 7	20
10	4 05. 0	75. 4	4 30. 1	74. 4	4 55. 1	73. 5	5 20. 1	72. 6	5 45. 1	71. 7	10
6 00	6 16. 8	76. 4	6 41. 4	75. 4	7 05. 8	74. 5	7 30. 2	73. 6	7 54. 5	72. 7	6 00
5 50	8 29. 1	77. 4	8 53. 1	76. 4	9 17. 1	75. 5	9 40. 9	74. 6	10 04. 6	73. 6	5 50
40	10 42. 1	78. 3	11 05. 6	77. 4	11 29. 1	76. 5	11 52. 3	75. 5	12 15. 3	74. 6	40
30	12 55. 4	79. 3	13 18. 4	78. 3	13 41. 4	77. 4	14 04. 1	76. 4	14 26. 6	75. 5	30
20	15 09. 2	80. 2	15 31. 9	79. 3	15 54. 3	78. 3	16 16. 5	77. 3	16 38. 5	76. 4	20
10	17 23. 1	81. 2	17 45. 7	80. 2	18 07. 6	79. 2	18 29. 4	78. 2	18 50. 9	77. 3	10
5 00	19 37. 9	82. 1	19 59. 8	81. 2	20 21. 4	80. 2	20 42. 7	79. 2	21 03. 7	78. 2	5 00
4 50	21 52. 7	83. 1	22 14. 3	82. 1	22 35. 5	81. 1	22 56. 4	80. 1	23 16. 9	79. 0	4 50
40	24 07. 8	84. 0	24 29. 1	83. 0	24 50. 0	82. 0	25 10. 6	80. 9	25 30. 6	79. 9	40
30	26 23. 0	85. 0	26 44. 1	83. 9	27 04. 8	82. 9	27 24. 8	81. 8	27 44. 6	80. 8	30
20	28 38. 6	85. 9	28 59. 5	84. 9	29 19. 8	83. 8	29 39. 7	82. 7	29 59. 0	81. 6	20
10	30 54. 1	86. 9	31 14. 9	85. 8	31 34. 9	84. 7	31 54. 6	83. 6	32 13. 6	82. 5	10
4 00	33 10. 1	87. 9	33 30. 6	86. 8	33 50. 5	85. 7	34 09. 8	84. 5	34 28. 5	83. 4	4 00
3 50	35 25. 9	88. 9	35 46. 3	87. 8	36 06. 1	86. 6	36 25. 1	85. 4	36 43. 7	84. 2	3 50
40	37 41. 9	90. 0	38 02. 3	88. 8	38 21. 9	87. 6	38 40. 9	86. 4	38 59. 0	85. 1	40
30	39 57. 8	91. 0	40 18. 1	89. 8	40 37. 8	88. 6	40 56. 5	87. 3	41 14. 6	86. 1	30
20	42 13. 7	92. 1	42 34. 2	90. 9	42 53. 8	89. 6	43 12. 5	88. 3	43 30. 3	87. 0	20
10	44 29. 5	93. 3	44 50. 0	92. 0	45 09. 8	90. 7	45 28. 2	89. 3	45 46. 2	87. 9	10
3 00	46 45. 2	94. 5	47 05. 9	93. 2	47 25. 5	91. 8	47 44. 3	90. 4	48 01. 9	88. 9	3 00
2 50	49 00. 5	95. 8	49 21. 5	94. 4	49 41. 4	92. 9	50 00. 1	91. 5	50 17. 9	90. 0	2 50
40	51 15. 7	97. 2	51 36. 9	95. 7	51 57. 0	94. 2	52 16. 1	92. 6	52 33. 8	91. 1	40
30	53 30. 2	98. 6	53 52. 0	97. 1	54 12. 6	95. 5	54 31. 9	93. 8	54 49. 7	92. 2	30
20	55 44. 5	100. 2	56 06. 8	98. 6	56 27. 7	96. 9	56 47. 4	95. 2	57 05. 4	93. 4	20
10	57 57. 8	101. 9	58 20. 8	100. 2	58 42. 4	98. 4	59 02. 5	96. 6	59 21. 1	94. 7	10
2 00	60 10. 4	103. 8	60 34. 4	101. 9	60 56. 6	100. 0	61 17. 3	98. 1	61 36. 4	96. 2	2 00
1 50	62 21. 7	106. 0	62 46. 6	104. 0	63 10. 1	102. 0	63 31. 7	99. 9	63 51. 5	97. 8	1 50
40	64 31. 7	108. 4	64 58. 1	106. 3	65 22. 5	104. 1	65 45. 1	101. 8	66 05. 7	99. 5	40
30	66 39. 5	111. 1	67 07. 5	108. 8	67 33. 7	106. 5	67 57. 5	104. 1	68 19. 5	101. 6	30
20	68 45. 1	114. 3	69 15. 2	111. 9	69 43. 1	109. 4	70 08. 7	106. 7	70 32. 0	104. 0	20
10	70 47. 0	118. 0	71 19. 7	115. 4	71 49. 8	112. 7	72 18. 0	109. 8	72 43. 2	106. 8	10
1 00	72 44. 6	122. 6	73 20. 2	119. 8	73 53. 4	116. 9	74 24. 2	113. 7	74 51. 9	110. 4	1 00
0 50	74 35. 5	128. 1	75 14. 8	125. 2	75 51. 8	122. 1	76 26. 2	118. 6	76 57. 7	114. 9	0 50
40	76 17. 4	135. 0	77 01. 3	132. 0	77 42. 7	128. 7	78 21. 9	125. 0	78 57. 7	121. 0	40
30	77 46. 5	143. 5	78 35. 0	140. 6	79 22. 2	137. 4	80 07. 0	133. 7	80 49. 0	129. 3	30
20	78 57. 5	153. 9	79 51. 5	151. 6	80 44. 2	148. 8	81 35. 7	145. 4	82 25. 0	141. 3	20
10	79 43. 7	166. 3	80 42. 1	165. 0	81 40. 0	163. 3	82 37. 4	161. 2	83 34. 1	158. 4	10
0 00	80 0. 0	180. 0	81 0. 0	180. 0	82 0. 0	180. 0	83 0. 0	180. 0	84 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40			0 15.6	66.8	0 42.6	66.0	1 09.7	65.0	1 36.7	64.2	6 40
30	1 54.7	68.8	2 21.1	67.9	2 47.2	67.0	3 13.4	66.1	3 39.6	65.2	30
20	4 02.0	69.8	4 27.4	68.9	4 52.9	68.0	5 18.2	67.1	5 43.4	66.2	20
10	6 09.8	70.8	6 34.6	69.9	6 59.2	68.9	7 23.8	68.0	7 48.2	67.1	10
6 00	8 18.6	71.7	8 42.7	70.8	9 06.5	69.9	9 30.3	69.0	9 53.9	68.0	6 00
5 50	10 28.1	72.7	10 51.3	71.8	11 14.5	70.8	11 37.5	69.9	12 00.3	68.9	5 50
40	12 38.1	73.6	13 00.9	72.7	13 23.3	71.7	13 45.5	70.8	14 07.6	69.8	40
30	14 48.8	74.5	15 10.9	73.6	15 32.7	72.6	15 54.2	71.6	16 15.4	70.6	30
20	17 00.2	75.4	17 21.6	74.4	17 42.7	73.5	18 03.5	72.5	18 24.1	71.5	20
10	19 12.0	76.3	19 32.8	75.3	19 53.2	74.3	20 13.5	73.3	20 33.2	72.3	10
5 00	21 24.3	77.1	21 44.6	76.1	22 04.4	75.1	22 23.9	74.1	22 43.1	73.1	5 00
4 50	23 37.1	78.0	23 56.7	77.0	24 16.4	75.9	24 35.0	74.9	24 53.2	73.8	4 50
40	25 50.2	78.8	26 09.5	77.8	26 28.1	76.7	26 46.4	75.7	27 04.2	74.6	40
30	28 03.7	79.7	28 22.5	78.6	28 40.6	77.5	28 58.3	76.4	29 15.5	75.3	30
20	30 17.7	80.5	30 36.0	79.4	30 53.6	78.3	31 10.7	77.2	31 27.2	76.1	20
10	32 31.9	81.4	32 49.7	80.2	33 06.8	79.1	33 23.4	77.9	33 39.2	76.8	10
4 00	34 46.4	82.2	35 03.9	81.0	35 20.6	79.9	35 36.6	78.7	35 51.9	77.5	4 00
3 50	37 01.4	83.0	37 18.3	81.8	37 34.5	80.6	37 50.1	79.4	38 04.7	78.2	3 50
40	39 16.4	83.9	39 33.1	82.7	39 48.8	81.4	40 03.8	80.1	40 18.1	78.9	40
30	41 31.7	84.8	41 47.9	83.5	42 03.4	82.2	42 17.9	80.9	42 31.5	79.6	30
20	43 47.1	85.7	44 03.2	84.3	44 18.2	83.0	44 32.3	81.6	44 45.4	80.2	20
10	46 02.9	86.6	46 18.6	85.2	46 33.0	83.8	46 47.0	82.3	46 59.4	80.9	10
3 00	48 18.5	87.5	48 34.1	86.0	48 48.5	84.6	49 01.8	83.1	49 13.9	81.6	3 00
2 50	50 34.3	88.5	50 49.7	86.9	51 03.8	85.4	51 16.9	83.8	51 28.4	82.3	2 50
40	52 50.3	89.5	53 05.7	87.8	53 19.5	86.2	53 32.0	84.6	53 43.4	83.0	40
30	55 06.2	90.5	55 21.5	88.8	55 35.1	87.1	55 47.5	85.4	55 58.1	83.7	30
20	57 22.1	91.6	57 37.5	89.8	57 51.0	88.0	58 03.1	86.2	58 13.5	84.3	20
10	59 38.1	92.8	59 53.3	90.9	60 06.9	89.0	60 18.9	87.0	60 28.7	85.0	10
2 00	61 53.7	94.1	62 09.3	92.1	62 22.9	90.0	62 34.6	87.9	62 44.4	85.7	2 00
1 50	64 09.2	95.6	64 25.0	93.4	64 38.6	91.1	64 50.5	88.8	65 00.0	86.5	1 50
40	66 24.3	97.2	66 40.7	94.8	66 54.7	92.3	67 06.4	89.7	67 15.9	87.2	40
30	68 38.9	99.0	68 56.0	96.4	69 10.3	93.6	69 22.5	90.9	69 31.5	88.1	30
20	70 52.7	101.1	71 10.9	98.2	71 26.0	95.3	71 38.2	92.1	71 47.5	88.9	20
10	73 05.5	103.7	73 25.0	100.4	73 41.0	97.0	73 54.0	93.5	74 03.2	89.9	10
1 00	75 16.6	106.8	75 38.2	103.1	75 55.7	99.2	76 09.6	95.2	76 19.5	91.0	1 00
0 50	77 25.2	111.0	77 49.5	106.7	78 09.2	102.2	78 24.7	97.4	78 35.0	92.4	0 50
40	79 29.7	116.5	79 58.0	111.5	80 21.2	106.0	80 39.1	100.3	80 50.9	94.1	40
30	81 28.0	124.3	82 01.5	118.6	82 29.5	111.9	82 52.0	104.7	83 36.0	96.8	30
20	83 11.6	136.3	83 54.1	130.0	84 31.2	122.2	85 00.8	112.6	85 20.5	101.4	20
10	84 29.6	154.7	85 23.1	149.6	86 13.4	142.1	86 57.9	130.7	87 30.9	113.2	10
0 00	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	89 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 16.0	91.0	1 50.6	92.0	1 25.0	92.9	0 59.7	93.8	0 34.2	94.7	5 50
40	4 31.8	92.1	4 06.3	93.0	3 40.9	93.9	3 15.2	94.8	2 49.6	95.7	40
30	6 47.7	93.2	6 22.0	94.1	5 56.2	95.0	5 30.6	95.9	5 04.7	96.8	30
20	9 03.3	94.3	8 37.5	95.2	8 11.7	96.1	7 45.7	97.0	7 19.6	97.9	20
10	11 18.8	95.4	10 52.8	96.3	10 26.6	97.2	10 00.4	98.1	9 34.0	99.0	10
5 00	13 34.0	96.5	13 07.7	97.4	12 41.4	98.3	12 14.8	99.2	11 48.1	100.1	5 00
4 50	15 48.9	97.6	15 22.4	98.5	14 55.7	99.5	14 28.8	100.4	14 01.6	101.3	4 50
40	18 03.5	98.7	17 36.6	99.7	17 09.6	100.6	16 42.3	101.6	16 14.7	102.5	40
30	20 17.6	99.9	19 50.5	100.9	19 22.9	101.8	18 55.1	102.8	18 27.1	103.7	30
20	22 31.3	101.1	22 03.6	102.1	21 35.7	103.1	21 07.4	104.0	20 38.8	105.0	20
10	24 44.4	102.4	24 16.2	103.4	23 47.7	104.4	23 18.9	105.3	22 49.3	106 3	10
4 00	26 56.8	103.7	26 28.0	104.7	25 59.1	105.7	25 29.5	106.6	24 59.8	107.6	4 00
3 50	29 08.5	105.1	28 39.2	106.1	28 09.5	107.1	27 39.4	108.0	27 08.8	109.0	3 50
40	31 19.3	106.5	30 49.3	107.5	30 19.0	108.5	29 48.1	109.5	29 16.9	110.5	40
30	33 29.1	108.0	32 58.5	109.0	32 27.2	110.0	31 55.6	111.0	31 23.6	112.0	30
20	35 37.9	109.5	35 06.4	110.6	34 34.4	111.6	34 01.9	112.6	33 28.9	113.6	20
10	37 45.2	111.2	37 12.9	112.3	36 40.0	113.3	36 06.5	114.3	35 32.6	115.3	10
3 00	39 51.4	112.9	39 17.9	114.0	38 44.1	115.1	38 09.5	116.1	37 34.6	117.1	3 00
2 50	41 55.6	114.7	41 21.2	115.9	40 46.2	117.0	40 10.7	118.0	39 34.6	119.0	2 50
40	43 58.2	116.7	43 22.5	117.9	42 46.4	118.9	42 09.5	120.0	41 32.2	121.1	40
30	45 58.4	118.8	45 21.5	120.0	44 44.1	121.1	44 06.0	122.2	43 27.2	123.2	30
20	47 56.2	121.1	47 17.9	122.3	46 39.2	123.4	45 59.6	124.5	45 19.5	125.5	20
10	49 51.0	123.6	49 11.4	124.7	48 31.0	125.8	47 50.0	126.9	47 08.4	128.0	10
2 00	51 42.6	126.2	51 01.3	127.4	50 19.4	128.5	49 36.8	129.6	48 53.6	130.7	2 00
1 50	53 30.2	129.1	52 47.6	130.3	52 03.6	131.4	51 19.4	132.5	50 34.5	133.5	1 50
40	55 13.5	132.2	54 28.6	133.4	53 43.3	134.5	52 57.2	135.6	52 10.6	136.6	40
30	56 51.4	135.6	56 04.9	136.7	55 17.5	137.8	54 29.5	138.9	53 41.2	139.9	30
20	58 23.5	139.3	57 34.7	140.4	56 45.6	141.4	55 55.8	142.4	55 05.6	143.4	20
10	59 48.4	143.3	58 58.0	144.3	58 06.8	145.3	57 15.1	146.3	56 23.1	147.2	10
1 00	61 05.7	147.6	60 13.0	148.6	59 20.0	149.5	58 26.5	150.4	57 32.7	151.3	1 00
0 50	62 13.8	152.3	61 19.2	153.2	60 24.2	154.0	59 29.0	154.8	58 33.5	155.6	0 50
40	63 11.6	157.4	62 15.2	158.1	61 18.7	158.8	60 21.8	159.5	59 25.0	160.1	40
30	63 58.1	162.7	63 00.2	163.3	62 02.2	163.9	61 04.1	164.4	60 05.9	164.9	30
20	64 32.2	168.3	63 33.1	168.7	62 34.1	169.1	61 34.9	169.4	60 35.9	169.8	20
10	64 53.0	174.1	63 53.2	174.3	62 53.5	174.5	61 53.8	174.7	60 54.0	174.9	10
0 00	65 0.0	180.0	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 08.8	95.6									5 50
40	2 23.9	96.6	1 58.2	97.6	1 32.5	98.5	1 06.7	99.4	0 40.9	100.3	40
30	4 38.8	97.7	4 12.8	98.6	3 46.6	99.5	3 20.7	100.4	2 54.4	101.3	30
20	6 53.3	98.8	6 27.0	99.7	6 00.7	100.6	5 34.1	101.5	5 07.5	102.4	20
10	9 07.5	99.9	8 40.8	100.8	8 14.0	101.7	7 47.1	102.6	7 19.9	103.5	10
5 00	11 21.2	101.0	10 54.1	102.0	10 26.9	102.9	9 59.4	103.8	9 31.8	104.7	5 00
4 50	13 34.3	102.2	13 06.8	103.1	12 38.9	104.1	12 11.2	105.0	11 42.9	105.8	4 50
40	15 46.9	103.4	15 18.9	104.3	14 50.6	105.2	14 22.0	106.1	13 53.3	107.0	40
30	17 58.7	104.6	17 30.1	105.5	17 01.4	106.5	16 32.2	107.4	16 02.9	108.3	30
20	20 10.0	105.9	19 40.7	106.8	19 11.3	107.8	18 41.4	108.7	18 11.5	109.6	20
10	22 20.2	107.2	21 50.4	108.1	21 20.2	109.1	20 49.7	110.0	20 19.1	110.9	10
4 00	24 29.7	108.5	23 59.1	109.5	23 28.3	110.4	22 57.0	111.4	22 25.5	112.3	4 00
3 50	26 37.9	109.9	26 06.7	110.9	25 35.0	111.8	25 03.0	112.8	24 30.6	113.7	3 50
40	28 45.2	111.4	28 13.0	112.4	27 40.5	113.3	27 07.5	114.3	26 34.3	115.2	40
30	30 50.9	113.0	30 17.8	114.0	29 44.5	114.9	29 10.8	115.9	28 36.5	116.8	30
20	32 55.4	114.6	32 21.4	115.6	31 47.0	116.6	31 12.2	117.5	30 36.9	118.5	20
10	34 58.1	116.3	34 23.2	117.3	33 47.7	118.3	33 11.9	119.3	32 35.4	120.1	10
3 00	36 59.0	118.1	36 22.9	119.1	35 46.4	120.1	35 09.3	121.1	34 31.8	122.1	3 00
2 50	39 57.8	120.0	38 20.6	121.1	37 42.8	122.1	37 04.7	123.0	36 25.9	124.0	2 50
40	40 54.3	122.1	40 15.8	123.1	39 36.8	124.1	38 57.2	125.1	38 17.3	126.0	40
30	42 48.0	124.3	42 08.2	125.3	41 27.9	126.3	40 47.1	127.2	40 05.7	128.1	30
20	44 38.8	126.6	43 57.5	127.6	43 15.9	128.6	42 33.5	129.6	41 50.8	130.5	20
10	46 26.2	129.1	45 43.5	130.1	45 00.2	131.1	44 16.6	132.0	43 32.4	132.9	10
2 00	48 09.9	131.7	47 25.6	132.7	46 40.9	133.7	45 55.5	134.6	45 09.7	135.5	2 00
1 50	49 49.1	134.6	49 03.2	135.5	48 16.8	136.5	47 30.0	137.4	46 42.6	138.3	1 50
40	51 23.6	137.6	50 36.0	138.5	49 48.0	139.5	48 59.3	140.4	48 10.4	141.3	40
30	52 52.4	140.9	52 03.1	141.8	51 13.2	142.7	50 23.2	143.6	49 32.6	144.4	30
20	54 15.0	144.3	53 24.0	145.2	52 32.6	146.1	51 40.6	146.9	50 48.5	147.7	20
10	55 30.8	148.1	54 37.9	148.9	53 44.8	149.7	52 51.4	150.5	51 57.8	151.2	10
1 00	56 38.6	152.0	55 44.2	152.8	54 49.6	153.5	53 54.5	154.2	52 59.4	154.9	1 00
0 50	57 37.9	156.3	56 41.9	156.9	55 45.8	157.6	54 49.5	158.2	53 53.0	158.8	0 50
40	58 27.9	160.7	57 30.6	161.3	56 33.3	161.8	55 35.5	162.3	54 37.8	162.8	40
30	59 07.6	165.3	58 09.2	165.8	57 10.6	166.2	56 12.1	166.6	55 13.4	167.0	30
20	59 36.6	170.1	58 37.2	170.4	57 38.0	170.7	56 38.5	171.0	55 39.1	171.2	20
10	59 54.1	175.0	58 54.3	175.2	57 54.5	175.3	56 54.7	175.5	55 54.8	175.6	10
0 00	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 15.2	101.2									5 40
30	2 28.2	102.2	2 01.9	103.1	1 35.7	104.0	1 09.4	104.9	0 43.1	105.9	30
20	4 40.8	103.3	4 14.2	104.2	3 47.3	105.1	3 20.5	106.0	2 53.6	106.9	20
10	6 52.9	104.4	6 25.6	105.3	5 58.2	106.2	5 30.8	107.1	5 03.2	108.0	10
5 00	9 04.1	105.6	8 36.3	106.5	8 08.3	107.4	7 40.3	108.3	7 12.1	109.2	5 00
4 50	11 14.7	106.7	10 46.2	107.6	10 17.7	108.5	9 48.9	109.4	9 20.1	110.3	4 50
40	13 24.5	107.9	12 55.5	108.8	12 26.2	109.7	11 56.7	110.6	11 27.0	111.5	40
30	15 33.4	109.2	15 03.5	110.1	14 33.6	111.0	14 03.4	111.9	13 32.9	112.8	30
20	17 41.2	210.5	17 10.7	111.4	16 40.0	112.3	16 08.9	113.2	15 37.7	114.1	20
10	19 48.0	111.8	19 16.7	112.7	18 45.1	113.6	18 13.2	114.5	17 41.1	115.4	10
4 00	21 53.6	113.2	21 21.6	114.1	20 49.0	115.0	20 16.3	115.9	19 43.3	116.8	4 00
3 50	23 57.9	114.6	23 24.9	115.6	22 51.5	116.5	22 17.8	117.4	21 43.8	118.3	3 50
40	26 00.7	116.1	25 26.8	117.1	24 52.4	118.0	24 17.7	118.9	23 42.7	119.8	40
30	28 02.0	117.7	27 26.9	118 7	26 51.6	119.6	26 15.9	120.5	25 39.8	121.3	30
20	30 01.3	119.4	29 25.3	120.3	28 48.9	121.2	28 12.0	122.1	27 34.9	123.0	20
10	31 58.7	121.1	31 21.5	122.1	30 44.1	123.0	30 06.1	123.9	29 27.8	124.7	10
3 00	33 53.9	123.0	33 15.7	123.9	32 36.9	124.8	31 57.8	125.7	31 18.2	126.6	3 00
2 50	35 46.8	125.0	35 07.2	125.9	34 27.2	126.7	33 46.9	127.6	33 05.9	128.5	2 50
40	37 36.8	127.0	36 56.1	127.9	36 14.7	128.8	35 32.0	129.7	34 50.8	130.6	40
30	39 23.9	129.1	38 41.7	130.0	37 59.0	130.9	37 16.1	131.8	36 32.6	132.7	30
20	41 07.7	131.4	40 24.1	132.3	39 40.0	133.2	38 55.6	134.1	38 10.7	134.9	20
10	42 47.7	133.8	42 02.5	134.7	41 17.1	135.6	40 31.2	136.5	39 45.0	137.3	10
2 00	44 23.5	136.4	43 37.1	137.3	42 50.1	138.2	42 02.6	139.0	41 14.9	139.8	2 00
1 50	45 54.9	139.2	45 06.8	140.1	44 18.3	140.9	43 29.5	141.7	42 40.2	142.5	1 50
40	47 21.1	142.1	46 31.6	142.9	45 41.5	143.7	44 51.1	144.5	44 00.4	145.3	40
30	48 41.8	145.2	47 50.5	146.0	46 59.0	146.7	46 07.2	147.5	45 15.1	148.2	30
20	49 56.1	148.4	49 03.6	149.2	48 10.5	149.9	47 17.2	150.6	46 23.7	151.2	20
10	51 03.9	151.9	50 09.6	152.6	49 15.2	153.2	48 20.6	153.8	47 25.8	154.4	10
1 00	52 04.1	155.5	51 08.6	156.1	50 12.9	156.7	49 16.9	157.3	48 20.8	157.8	1 00
0 50	52 56.4	159.3	51 59.4	159.8	51 02.6	160.3	50 05.5	160.8	49 08.4	161.3	0 50
40	43 40.1	163.2	52 42.2	163.7	51 44.2	164.1	50 46.1	164.5	49 47.9	164.9	40
30	54 14.7	167.3	53 15.9	167.7	52 17.1	168.0	51 18.1	168.3	50 19.1	168.6	30
20	54 39.7	171.5	53 40.4	171.7	52 40.9	171.9	51 41.4	172.1	50 41.8	172.3	20
10	54 55.0	175.7	53 55.1	175.8	52 55.2	176.0	51 55.3	176.1	50 55.4	176.2	10
0 00	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 16.8	106.7									5 30
20	2 26.6	107.8	1 59.6	108.7	1 32.5	109.6	1 05.5	110.5	0 38.5	111.4	20
10	4 35.7	108.9	4 07.9	109.8	3 40.1	110.7	3 12.5	111.6	2 44.7	112.5	10
5 00	6 43.8	110.0	6 15.4	110.9	5 46.9	111.8	5 18.3	112.7	4 49.8	113.6	5 00
4 50	8 51.1	111.2	8 21.9	112.1	7 52.6	113.0	7 23.4	113.8	6 53.8	114.7	4 50
40	10 57.3	112.4	10 27.3	113.3	9 57.2	114.2	9 27.0	115.0	8 56.7	115.9	40
30	13 02.4	113.6	12 31.6	114.5	12 00.7	115.4	11 29.6	116.3	10 58.3	117.1	30
20	15 06.3	114.9	14 34.7	115.8	14 02.8	116.7	13 30.8	117.6	12 58.6	118.4	20
10	17 08.8	116.3	16 36.3	117.2	16 03.5	118.0	15 30.6	118.9	14 57.3	119.7	10
4 00	19 10.1	117.7	18 36.5	118.6	18 02.7	119.4	17 28.8	120.3	16 54.6	121.1	4 00
3 50	21 09.6	119.1	20 35.1	120.0	20 00.3	120.8	19 25.4	121.7	18 50.1	122.5	3 50
40	23 07.5	120.6	22 31.9	121.5	21 56.0	122.4	21 20.0	123.2	20 43.6	124.1	40
30	25 03.5	122.2	24 26.8	123.1	23 49.8	124.0	23 12.7	124.8	22 35.2	125.7	30
20	26 57.5	123.9	26 19.7	124.8	25 41.5	125.6	25 03.2	126.5	24 24.5	127.3	20
10	28 49.1	125.7	28 10.1	126.5	27 30.9	127.3	26 51.2	128.2	26 11.4	129.0	10
3 00	30 38.4	127.5	29 58.2	128.3	29 17.6	129.2	28 36.5	130.0	27 55.6	130.8	3 00
2 50	32 24.8	129.4	31 43.4	130.2	31 01.6	131.1	30 19.5	131.9	29 37.0	132.7	2 50
40	34 08.5	131.4	33 25.7	132.3	32 42.4	133.1	31 59.1	133.9	31 15.3	134.7	40
30	35 48.8	133.5	35 04.6	134.4	34 20.1	135.2	33 35.4	136.0	32 50.2	136.8	30
20	37 25.5	135.8	36 40.0	136.6	35 54.1	137.4	35 08.0	138.2	34 21.4	138.9	20
10	38 58.3	138.1	38 11.4	138.9	37 24.1	139.7	36 36.6	140.5	35 48.7	141.2	10
2 00	40 26.9	140.6	39 38.6	141.4	38 49.8	142.1	38 00.9	142.9	37 11.7	143.6	2 00
1 50	41 50.8	143.2	31 00.9	144.0	40 10.9	144.7	39 20.6	145.4	38 30.0	146.1	1 50
40	43 09.5	146.0	42 18.4	146.7	41 26.8	147.4	40 35.1	148.1	39 43.2	148.7	40
30	44 22.8	148.9	43 30.1	149.5	42 37.4	150.2	41 44.4	150.8	40 51.2	151.4	30
20	45 30.0	151.9	44 36.1	152.5	43 41.9	153.1	42 47.6	153.7	41 53.2	154.3	20
10	46 30.8	155.0	45 35.5	155.7	44 40.1	156.2	43 44.8	156.7	42 49.1	157.2	10
1 00	47 24.6	158.3	46 28.3	158.8	45 31.7	159.3	44 35.2	159.8	43 38.4	160.2	1 00
0 50	48 11.1	161.7	47 13.7	162.2	46 16.1	162.6	45 18.7	163.0	44 21.0	163.3	0 50
40	48 49.8	165.2	47 51.4	165.6	46 53.0	166.0	45 54.5	166.3	44 56.2	166.6	40
30	49 20.2	168.8	48 21.1	169.1	47 22.1	169.4	46 23.0	169.6	45 23.9	169.9	30
20	49 42.3	172.5	48 42.6	172.7	47 43.0	172.9	46 43.4	173.1	45 43.9	173.2	20
10	49 55.6	176.2	48 55.7	176.3	47 55.8	176.4	46 55.9	176.5	45 56.0	176.6	10
0 00	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 11.5	112.3									5 20
10	2 16.7	113.4	1 48.9	114.2	1 21.0	115.1	0 53.1	116.0	0 25.2	116.9	10
5 00	4 21.1	114.5	3 52.4	115.3	3 23.5	116.2	2 54.7	117.1	2 25.8	118.0	5 00
4 50	6 24.2	115.6	5 54.7	116.4	5 24.9	117.3	4 55.2	118.2	4 25.2	119.1	4 50
40	8 26.2	116.8	7 55.8	117.6	7 25.0	118.5	6 54.2	119.4	6 23.4	120.3	40
30	10 26.8	118.0	9 55.4	118.9	9 23.7	119.8	8 51.9	120.6	8 20.1	121.5	30
20	12 26.2	119.3	11 53.8	120.2	11 21.0	121.0	10 48.2	121.8	10 15.3	122.7	20
10	14 24.0	120.6	13 50.5	121.5	13 16.7	122.3	12 42.8	123.1	12 08.7	124.0	10
4 00	16 20.1	122.0	15 45.6	122.9	15 01.8	123.7	14 35.8	124.5	14 00.6	125.4	4 00
3 50	18 14.6	123.4	17 38.8	124.3	17 02.9	125.1	16 26.8	125.9	15 50.4	126.8	3 50
40	20 07.1	124.9	19 30.2	125.8	18 53.1	126.6	18 15.8	127.4	17 38.4	128.3	40
30	21 57.3	126.5	21 19.3	127.4	20 41.1	128.2	20 02.6	129.0	19 23.9	129.8	30
20	23 45.5	128.1	23 06.3	129.0	22 26.8	129.8	21 47.1	130.6	21 07.2	131.4	20
10	25 31.2	129.8	24 50.7	130.7	24 09.8	131.5	23 29.1	132.3	22 47.8	133.1	10
3 00	27 14.2	131.6	26 32.5	132.5	25 50.5	133.3	25 08.2	134.0	24 25.8	134.8	3 00
2 50	28 54.2	133.5	28 11.2	134.3	27 27.9	135.1	26 44.5	135.8	26 00.7	136.6	2 50
40	30 31.3	135.5	29 47.0	136.3	29 02.3	137.0	28 17.5	137.8	27 32.4	138.6	40
30	32 04.7	137.6	31 19.2	138.8	30 33.2	139.1	29 47.1	139.8	29 00.6	140.5	30
20	33 34.7	139.7	32 47.8	140.4	32 00.4	141.2	31 12.9	141.9	30 25.2	142.6	20
10	35 00.6	142.0	34 12.3	142.7	33 23.7	143.4	32 34.9	144.1	31 45.7	144.8	10
2 00	36 22.2	144.3	35 32.6	145.0	34 42.6	145.7	33 52.4	146.3	33 02.1	147.0	2 00
1 50	37 39.2	146.7	36 48.2	147.4	35 56.8	148.1	35 05.5	148.7	34 13.8	149.3	1 50
40	38 58.1	149.3	37 58.9	150.0	37 06.3	150.6	36 13.5	151.2	35 20.7	151.8	40
30	39 57.6	152.0	39 04.2	152.6	38 10.4	153.2	37 16.5	153.7	36 22.4	154.3	30
20	40 58.6	154.8	40 03.9	155.3	39 08.8	155.9	38 13.8	156.4	37 18.6	156.9	20
10	41 53.2	157.7	40 57.5	158.2	40 01.4	158.6	39 05.3	159.1	38 09.1	159.6	10
1 00	42 41.6	160.7	41 44.8	161.1	40 47.7	161.5	39 50.7	161.9	38 53.5	162.3	1 00
0 50	43 25.2	163.7	42 25.4	164.1	41 27.5	164.5	40 29.6	164.8	39 31.6	165.2	0 50
40	43 57.6	166.9	42 59.1	167.2	42 00.5	167.5	41 01.8	167.8	40 03.7	168.1	40
30	44 24.7	170.1	43 25.6	170.3	42 26.3	170.6	41 27.2	170.8	40 27.9	171.0	30
20	44 44.3	173.4	43 44.7	173.5	42 45.0	173.7	41 45.4	173.8	40 45.8	174.0	20
10	44 56.1	176.7	43 56.2	176.7	42 56.2	176.8	41 56.3	176.9	40 56.4	177.0	10
0 00	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 26.3	89.1	0 52.6	88.2	1 18.9	87.3	1 45.1	86.4	6 00
5 50	2 14.8	91.1	2 41.2	90.2	3 07.3	89.3	3 33.6	88.4	3 59.8	87.5	5 50
40	4 29.6	92.2	4 55.9	91.3	5 22.2	90.4	5 48.4	89.5	6 14.5	88.6	40
30	6 44.2	93.3	7 10.6	92.4	7 36.9	91.5	8 03.2	90.6	8 29.2	89.7	30
20	8 57.7	94.4	9 25.3	93.5	9 51.7	92.6	10 18.0	91.7	10 44.0	90.8	20
10	11 13.0	95.5	11 39.8	94.6	12 06.3	93.7	12 32.8	92.8	12 58.9	91.9	10
5 00	13 27.1	96.7	13 54.0	95.8	14 20.7	94.9	14 47.3	93.9	15 13.5	93.0	5 00
4 50	15 40.8	97.9	16 08.1	96.9	16 35.0	96.0	17 01.8	95.0	17 28.2	94.1	4 50
40	17 54.1	99.1	18 21.7	98.1	18 48.9	97.2	19 15.9	96.2	19 42.5	95.3	40
30	20 07.0	100.3	20 34.9	99.3	21 02.4	98.4	21 29.7	97.4	21 56.6	96.5	30
20	22 19.5	101.6	22 47.7	100.6	23 15.6	99.7	23 43.2	98.7	24 10.3	97.7	20
10	24 31.2	102.9	24 59.9	101.9	25 28.2	100.9	25 56.2	99.9	26 23.8	98.9	10
4 00	26 42.3	104.2	27 11.5	103.2	27 40.3	102.2	28 08.8	101.2	28 36.7	100.2	4 00
3 50	28 52.6	105.6	29 22.4	104.6	29 51.7	103.6	30 20.7	102.6	30 49.2	101.6	3 50
40	31 02.0	107.1	31 32.4	106.1	32 02.4	105.0	32 31.9	104.0	33 00.8	103.0	40
30	33 10.3	108.6	33 41.5	107.6	34 12.1	106.5	34 42.2	105.5	35 11.8	104.4	30
20	35 17.5	110.2	35 49.5	109.2	36 20.8	108.1	36 51.7	107.0	37 21.9	106.0	20
10	37 23.3	111.9	37 56.2	110.9	38 28.3	109.8	39 00.1	108.7	39 31.0	107.6	10
3 00	39 27.6	113.7	40 01.4	112.6	40 34.5	111.5	41 07.1	110.4	41 38.9	109.3	3 00
2 50	41 30.2	115.6	42 04.9	114.5	42 39.1	113.4	43 12.8	112.2	43 45.5	111.1	2 50
40	43 30.8	117.6	44 06.7	116.5	44 42.2	115.4	45 16.6	114.2	45 50.4	113.0	40
30	45 29.0	119.7	46 06.2	118.6	46 42.6	117.5	47 18.5	116.3	47 53.6	115.1	30
20	47 24.8	122.1	48 03.3	120.9	48 41.2	119.8	49 18.2	118.5	49 54.5	117.3	20
10	49 17.4	124.5	49 57.4	123.4	50 36.8	122.2	51 15.4	120.9	51 53.1	119.7	10
2 00	51 06.7	127.2	51 48.3	126.1	52 29.1	124.9	53 09.3	123.6	53 48.5	122.4	2 00
1 50	52 52.0	130.1	53 35.2	129.0	54 17.8	127.8	54 59.6	126.5	55 40.6	125.2	1 50
40	54 32.8	133.2	55 17.9	132.1	56 02.0	130.9	56 45.8	129.7	57 28.5	128.4	40
30	56 08.1	136.6	56 55.1	135.5	57 41.4	134.3	58 27.0	133.1	59 11.8	131.8	30
20	57 37.6	140.3	58 26.6	139.2	59 14.8	138.1	60 02.4	136.9	60 49.3	135.6	20
10	59 00.0	144.3	59 50.9	143.2	60 41.2	142.1	61 31.0	141.0	62 20.1	139.8	10
1 00	60 14.8	148.6	61 07.6	147.6	61 59.9	146.6	62 51.8	145.5	63 43.0	144.3	1 00
0 50	61 20.5	153.2	62 15.0	152.3	63 09.2	151.4	64 03.4	150.4	64 56.9	149.4	0 50
40	62 16.1	158.1	63 12.6	157.4	64 08.7	156.6	65 04.6	155.7	66 00.0	154.8	40
30	63 00.7	163.3	63 58.6	162.7	64 56.4	162.1	65 53.9	161.4	66 51.4	160.7	30
20	63 33.4	168.7	64 32.4	168.3	65 31.3	167.9	66 30.3	167.4	67 29.0	166.9	20
10	65 53.3	174.3	64 53.1	174.1	65 52.8	173.9	66 52.5	173.6	67 52.2	173.4	10
0 00	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10			0 23.5	83.5	0 50.0	82.6	1 16.3	81.7	1 42.6	80.8	6 10
6 00	2 11.4	85.5	2 37.6	84.6	3 03.7	83.7	3 29.9	82.8	3 55.9	81.9	6 00
5 50	4 25.9	86.6	4 51.9	85.7	5 17.9	84.8	5 43.8	83.9	6 09.6	83.0	5 50
40	6 40.5	87.7	7 06.5	86.8	7 32.2	85.9	7 58.0	84.9	8 23.5	84.0	40
30	8 55.3	88.8	9 21.1	87.8	9 46.9	86.9	10 12.3	86.0	10 37.7	85.1	30
20	11 10.1	89.9	11 35.9	88.9	12 01.5	88.0	12 27.0	87.1	12 52.1	86.1	20
10	13 24.9	91.0	13 50.8	90.0	14 16.3	89.1	14 41.6	88.1	15 06.8	87.2	10
5 00	15 39.7	92.1	16 05.5	91.1	16 31.1	90.2	16 56.5	89.2	17 21.4	88.3	5 00
4 50	17 54.4	93.2	18 20.2	92.2	18 45.9	91.3	19 11.3	90.3	19 36.3	89.4	4 50
40	20 08.9	94.3	20 34.9	93.4	21 00.6	92.4	21 26.1	91.4	21 51.0	90.5	40
30	22 23.2	95.5	22 49.4	94.5	23 15.3	93.5	23 40.8	92.6	24 05.8	91.6	30
20	24 37.2	96.7	25 03.7	95.7	25 29.7	94.7	25 55.4	93.7	26 20.5	92.7	20
10	26 50.9	97.9	27 17.8	96.9	27 43.9	95.9	28 09.8	94.9	28 35.1	93.9	10
4 00	29 04.2	99.2	29 31.4	98.2	29 57.9	97.2	30 24.1	96.1	30 49.5	95.1	4 00
3 50	31 17.1	100.5	31 44.6	99.5	32 11.5	98.4	32 37.9	97.4	33 03.8	96.3	3 50
40	33 29.3	101.9	33 57.3	100.9	34 24.6	99.8	34 51.4	98.7	35 17.5	97.6	40
30	35 40.9	103.4	36 09.3	102.3	36 37.2	101.2	37 04.4	100.0	37 30.9	98.9	30
20	37 51.6	104.9	38 20.7	103.7	38 49.1	102.6	39 16.9	101.5	39 43.8	100.3	20
10	40 01.5	106.4	40 31.3	105.3	41 00.3	104.2	41 28.6	103.0	41 56.3	101.8	10
3 00	42 10.1	108.1	42 40.7	107.0	43 10.5	105.8	43 39.6	104.6	44 07.8	103.3	3 00
2 50	44 17.6	109.1	44 49.1	108.7	45 19.7	107.5	45 49.5	106.3	46 18.5	105.0	2 50
40	46 23.6	111.8	46 56.1	110.6	47 27.6	109.3	47 58.4	108.1	48 28.2	106.8	40
30	48 28.1	113.9	49 01.5	112.6	49 34.1	111.3	50 05.9	110.0	50 36.7	108.7	30
20	50 30.1	116.1	51 04.9	114.8	51 38.8	113.5	52 11.7	112.1	52 43.6	110.7	20
10	52 30.0	118.4	53 06.2	117.1	53 41.4	115.8	54 15.6	114.4	54 48.7	112.9	10
2 00	54 27.0	121.1	55 04.8	119.7	55 41.4	118.3	56 17.2	116.9	56 51.7	115.4	2 00
1 50	56 20.8	123.9	57 00.2	122.5	57 38.5	121.1	58 16.0	119.6	58 52.3	118.1	1 50
40	58 10.6	127.0	58 52.0	125.6	59 32.1	124.2	60 11.4	122.7	60 49.4	121.1	40
30	59 55.9	130.5	60 39.1	129.1	61 21.3	127.6	62 02.6	126.1	62 42.7	124.5	30
20	61 35.5	134.3	62 21.0	132.9	63 05.3	131.4	63 49.0	129.9	64 31.3	128.3	20
10	63 08.6	138.5	63 56.5	137.1	64 43.3	135.7	65 29.2	134.1	66 14.2	132.5	10
1 00	64 33.8	143.1	65 24.1	141.8	66 13.3	140.4	67 02.1	138.9	67 49.5	137.4	1 00
0 50	65 50.2	148.2	66 42.6	147.0	67 34.5	145.7	68 25.7	144.4	69 16.2	142.9	0 50
40	66 55.4	153.8	67 50.4	152.8	68 44.6	151.6	69 38.7	150.4	70 31.7	149.0	40
30	67 48.5	159.9	68 45.2	159.0	69 42.0	158.1	70 38.2	157.0	71 34.0	155.9	30
20	68 27.7	166.3	69 26.3	165.7	70 24.6	165.0	71 23.0	164.3	72 20.9	163.5	20
10	68 51.9	173.1	69 51.5	172.8	70 51.1	172.4	71 50.7	172.0	72 50.2	171.6	10
0 00	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20			0 23.2	77.9	0 49.9	77.0	1 16.6	76.1	1 43.3	75.2	6 20
10	2 09.0	79.9	2 35.3	79.0	3 01.7	78.1	3 27.8	77.2	3 54.0	76.3	10
6 00	4 21.9	81.0	4 47.9	80.1	5 13.8	79.2	5 39.6	78.3	6 05.3	77.4	6 00
5 50	6 35.2	82.1	7 00.9	81.2	7 26.4	80.2	7 51.8	79.3	8 17.8	78.4	5 50
40	8 49.0	83.1	9 14.3	82.2	9 39.5	81.3	10 04.5	80.4	10 29.4	79.4	40
30	11 02.9	84.2	11 27.9	83.2	11 52.9	82.3	12 17.7	81.4	12 42.1	80.4	30
20	13 17.2	85.2	13 42.0	84.2	14 06.7	83.3	14 31.1	82.4	14 55.3	81.5	20
10	15 31.7	86.3	15 56.3	85.3	16 20.8	84.4	16 44.9	83.4	17 08.8	82.5	10
5 00	17 46.3	87.3	18 10.8	86.4	18 35.1	85.4	18 58.9	84.4	19 22.6	83.5	5 00
4 50	20 00.9	88.4	20 25.4	87.4	20 49.5	86.5	21 13.1	85.5	21 36.6	84.5	4 50
40	22 15.8	89.5	22 40.2	88.5	23 04.2	87.5	23 27.7	86.5	23 50.9	85.5	40
30	24 30.6	90.6	24 54.9	89.6	25 18.9	88.6	25 42.3	87.5	26 05.4	86.5	30
20	26 45.4	91.7	27 09.8	90.7	27 33.7	89.6	27 57.1	88.6	28 20.1	87.5	20
10	29 00.2	92.8	29 24.5	91.8	29 48.6	90.7	30 11.9	89.7	30 34.7	88.6	10
4 00	31 14.7	94.0	31 39.2	92.9	32 03.3	91.8	32 26.7	90.8	32 49.6	89.7	4 00
3 50	33 29.0	95.2	33 53.8	94.1	34 18.0	93.0	34 41.4	91.9	35 03.7	90.8	3 50
40	35 43.2	96.5	36 08.2	95.4	36 32.6	94.2	36 56.2	93.1	37 19.2	91.9	40
30	37 56.9	97.8	38 22.3	96.6	38 46.9	95.5	39 10.8	94.3	39 33.8	93.1	30
20	40 10.3	99.1	40 35.9	98.0	41 00.9	96.7	41 25.0	95.5	41 48.4	94.3	20
10	42 23.2	100.6	42 49.2	99.4	43 14.6	98.1	43 39.0	96.9	44 02.8	95.6	10
3 00	44 35.2	102.1	45 02.0	100.8	45 27.9	99.5	45 52.7	98.2	46 16.8	96.9	3 00
2 50	46 46.8	103.7	47 14.0	102.4	47 40.4	101.1	48 05.8	99.7	48 30.3	98.3	2 50
40	48 57.2	105.4	49 25.3	104.1	49 52.5	102.7	50 18.4	101.3	50 43.5	99.9	40
30	51 06.6	107.3	51 35.3	105.9	52 03.4	104.5	52 30.1	103.0	52 55.9	101.5	30
20	53 14.6	109.3	53 44.6	107.8	54 13.5	106.3	54 41.1	104.8	55 07.7	103.3	20
10	55 21.0	111.5	55 52.1	109.9	56 22.1	108.4	56 50.8	106.8	57 18.5	105.3	10
2 00	57 25.3	113.9	57 57.9	112.3	58 29.3	110.7	58 59.2	109.0	59 27.8	107.3	2 00
1 50	59 27.5	116.5	60 01.3	114.9	60 34.2	113.2	61 05.5	111.4	61 35.7	109.6	1 50
40	61 26.5	119.5	62 02.4	117.8	62 37.0	116.0	63 09.9	114.2	63 41.6	112.3	40
30	63 21.9	122.8	63 59.7	121.0	64 36.4	119.2	65 11.4	117.3	65 45.0	115.3	30
20	65 12.8	126.5	65 53.1	124.7	66 32.0	122.9	67 09.3	120.9	67 45.1	118.8	20
10	66 58.2	130.8	67 40.8	129.0	68 22.6	127.1	69 02.8	125.0	69 41.0	122.8	10
1 00	68 36.4	135.7	69 22.2	133.9	70 06.6	131.9	70 49.7	129.8	71 31.2	127.6	1 00
0 50	70 06.0	141.2	70 54.6	139.4	71 42.4	137.6	72 29.0	135.5	73 14.0	133.3	0 50
40	71 24.5	147.6	72 16.5	145.9	73 07.7	144.2	73 57.5	142.2	74 46.6	140.1	40
30	72 29.6	154.7	73 24.7	153.3	74 19.0	151.8	75 12.8	150.0	76 05.5	148.2	30
20	73 18.9	162.6	74 16.5	161.6	75 13.7	160.5	76 10.6	159.2	77 07.0	157.7	20
10	73 49.5	171.1	74 48.9	170.6	75 48.2	170.0	76 47.4	169.3	77 46.4	168.5	10
0 00	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30	0 00. 5	73. 3	0 27. 7	72. 4	0 54. 9	71. 5	1 22. 1	70. 6	1 49. 3	69. 7	6 30
20	2 10. 0	74. 4	2 36. 6	73. 5	3 03. 2	72. 6	3 29. 8	71. 7	3 56. 2	70. 8	20
10	4 20. 1	75. 4	4 46. 1	74. 5	5 12. 1	73. 6	5 38. 0	72. 7	6 03. 9	71. 8	10
6 00	6 30. 9	76. 5	6 56. 4	75. 5	7 21. 8	74. 6	7 47. 1	73. 7	8 12. 3	72. 8	6 00
5 50	8 42. 1	77. 5	9 07. 1	76. 6	9 32. 1	75. 5	9 56. 8	74. 7	10 21. 4	73. 8	5 50
40	10 54. 1	78. 5	11 18. 6	77. 6	11 43. 0	76. 7	12 07. 2	75. 7	12 31. 2	74. 8	40
30	13 06. 4	79. 5	13 30. 6	78. 6	13 54. 4	77. 7	14 18. 1	76. 7	14 41. 6	75. 8	30
20	15 19. 2	80. 5	15 42. 9	79. 6	16 06. 4	78. 6	16 29. 5	77. 6	16 52. 5	76. 7	20
10	17 32. 3	81. 5	17 55. 7	80. 6	18 18. 8	79. 6	18 41. 4	78. 6	19 03. 9	77. 6	10
5 00	19 45. 9	82. 5	20 08. 9	81. 5	20 31. 5	80. 5	20 53. 8	79. 5	21 15. 8	78. 5	5 00
4 50	21 59. 6	83. 5	22 22. 3	82. 5	22 44. 7	81. 5	23 06. 5	80. 5	23 28. 2	79. 5	4 50
40	24 13. 7	84. 5	24 36. 2	83. 5	24 58. 2	82. 4	25 19. 7	81. 4	25 40. 9	80. 4	40
30	26 28. 0	85. 5	26 50. 2	84. 4	27 11. 8	83. 4	27 33. 2	82. 3	27 54. 0	81. 3	30
20	28 42. 5	86. 5	29 04. 5	85. 4	29 26. 1	84. 4	29 47. 0	83. 3	30 07. 4	82. 2	20
10	30 57. 1	87. 5	31 19. 0	86. 4	31 40. 2	85. 3	32 01. 0	84. 2	32 21. 2	83. 1	10
4 00	33 11. 9	88. 6	33 33. 6	87. 4	33 54. 8	86. 3	34 15. 2	85. 2	34 35. 1	84. 1	4 00
3 50	35 26. 7	89. 6	35 48. 4	88. 5	36 09. 3	87. 3	36 29. 7	86. 2	36 49. 3	85. 0	3 50
40	37 41. 5	90. 7	38 03. 1	89. 6	38 24. 1	88. 4	38 44. 2	87. 2	39 03. 7	86. 0	40
30	39 56. 2	91. 9	40 18. 0	90. 7	40 38. 8	89. 4	40 58. 9	88. 2	41 18. 2	86. 9	30
20	42 11. 0	93. 1	42 32. 8	91. 8	42 53. 8	90. 5	43 13. 7	89. 2	43 32. 9	87. 9	20
10	44 25. 7	94. 3	44 47. 4	93. 0	45 08. 4	91. 7	45 28. 6	90. 3	45 47. 7	89. 0	10
3 00	46 39. 8	95. 6	47 02. 0	94. 2	47 23. 2	92. 9	47 43. 3	91. 5	48 02. 5	90. 0	3 00
2 50	48 53. 9	97. 0	49 16. 4	95. 5	49 37. 8	94. 1	49 58. 0	92. 6	50 17. 0	91. 1	2 50
40	51 07. 4	98. 4	51 30. 4	96. 9	51 52. 1	95. 4	52 12. 6	93. 9	52 32. 1	92. 3	40
30	53 20. 5	100. 0	53 43. 5	98. 4	54 06. 1	96. 8	54 27. 1	95. 2	54 46. 7	93. 6	30
20	55 32. 9	101. 7	55 57. 1	100. 0	56 19. 9	98. 4	56 41. 1	96. 7	57 01. 1	94. 9	20
10	57 44. 5	103. 5	58 09. 5	101. 8	58 32. 8	100. 0	58 54. 9	98. 2	59 15. 4	96. 4	10
2 00	59 55. 1	105. 5	60 20. 9	103. 7	60 45. 3	101. 8	61 07. 9	99. 9	61 29. 0	98. 0	2 00
1 50	62 04. 2	107. 8	62 31. 2	105. 9	62 56. 7	103. 9	63 20. 4	101. 8	63 42. 2	99. 7	1 50
40	64 11. 6	110. 3	64 40. 2	108. 3	65 06. 9	106. 2	65 31. 7	104. 0	65 54. 7	101. 7	40
30	66 17. 0	113. 2	66 47. 2	111. 1	67 15. 5	108. 8	67 41. 8	106. 4	68 06. 2	104. 0	30
20	68 19. 2	116. 6	68 51. 7	114. 3	69 22. 1	111. 9	69 50. 2	109. 3	70 16. 1	106. 7	20
10	70 17. 8	120. 5	70 52. 5	118. 0	71 25. 5	115. 5	71 56. 0	112. 7	72 24. 0	109. 8	10
1 00	72 11. 0	125. 2	72 49. 1	122. 6	73 25. 1	119. 9	73 58. 5	116. 9	74 29. 5	113. 8	1 00
0 50	73 57. 2	130. 8	74 39. 0	128. 2	75 18. 8	125. 3	75 56. 0	122. 1	76 30. 2	118. 7	0 50
40	75 33. 9	137. 7	76 19. 9	135. 0	77 04. 0	132. 1	77 45. 7	128. 8	78 25. 0	125. 2	40
30	76 57. 0	146. 0	77 48. 0	143. 5	78 36. 8	140. 8	79 24. 0	137. 5	80 09. 0	133. 8	30
20	78 02. 7	156. 0	78 58. 1	154. 0	79 52. 2	151. 7	80 45. 4	148. 9	81 36. 9	145. 6	20
10	78 45. 3	167. 5	79 43. 9	166. 4	80 42. 3	165. 0	81 40. 3	163. 4	82 37. 8	161. 2	10
0 00	79 0. 0	180. 0	80 0. 0	180. 0	81 0. 0	180. 0	82 0. 0	180. 0	83 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40	0 11.2	67.7	0 39.1	66.8	1 07.1	66.0	1 34.9	65.1	2 02.9	64.2	6 40
30	2 16.4	68.8	2 43.7	67.9	3 10.7	67.0	3 37.7	66.1	4 04.7	65.2	30
20	4 22.6	69.9	4 49.0	69.0	5 15.3	68.1	5 41.5	67.2	6 07.7	66.3	20
10	6 29.6	70.9	6 55.2	70.0	7 20.7	69.1	7 46.1	68.2	8 11.6	67.3	10
6 00	8 37.4	71.9	9 02.3	71.0	9 27.1	70.0	9 51.8	69.1	10 16.2	68.2	6 00
5 50	10 45.8	72.9	11 10.2	72.0	11 34.2	71.0	11 58.1	70.1	12 21.9	69.1	5 50
40	12 55.1	73.8	13 18.6	72.9	13 42.0	71.9	14 05.2	71.0	14 28.1	70.0	40
30	15 04.7	74.8	15 27.8	73.8	15 50.4	72.9	16 12.8	71.9	16 35.2	70.9	30
20	17 15.2	75.7	17 37.5	74.7	17 59.6	73.8	18 21.5	72.8	18 42.9	71.8	20
10	19 26.2	76.6	19 47.9	75.6	20 09.3	74.6	20 30.5	73.6	20 51.4	72.6	10
5 00	21 37.5	77.5	21 58.7	76.5	22 19.7	75.5	22 40.2	74.5	23 00.3	73.5	5 00
4 50	23 49.3	78.4	24 10.1	77.4	24 30.4	76.4	24 50.3	75.3	25 10.8	74.3	4 50
40	26 01.7	79.3	26 21.8	78.3	26 41.7	77.2	27 01.0	76.2	27 19.8	75.1	40
30	28 14.0	80.2	28 34.1	79.1	28 53.3	78.1	29 12.1	77.0	29 30.4	75.9	30
20	30 27.4	81.1	30 46.7	80.0	31 05.5	78.9	31 23.8	77.8	31 41.3	76.7	20
10	32 40.7	82.0	32 59.7	80.9	33 18.0	79.7	33 35.6	78.6	33 52.7	77.5	10
4 00	34 54.4	82.9	35 12.8	81.7	35 30.8	80.6	35 48.0	79.4	36 04.4	78.2	4 00
3 50	37 08.2	83.8	37 26.5	82.6	37 43.9	81.4	38 00.6	80.2	38 16.7	78.9	3 50
40	39 22.4	84.7	39 40.3	83.5	39 57.5	82.2	40 13.7	81.0	40 29.1	79.7	40
30	41 36.7	85.7	41 54.4	84.4	42 11.1	83.1	42 26.9	81.8	42 42.0	80.5	30
20	43 51.3	86.6	44 08.6	85.3	44 25.1	83.9	44 40.5	82.6	44 55.0	81.2	20
10	46 05.7	87.6	46 23.1	86.2	46 39.2	84.8	46 54.2	83.4	47 08.5	82.0	10
3 00	48 20.7	88.6	48 37.7	87.2	48 53.6	85.7	49 08.4	84.2	49 22.0	82.7	3 00
2 50	50 35.4	89.6	50 52.4	88.2	51 08.1	86.6	51 22.6	85.1	51 35.9	83.5	2 50
40	52 50.3	90.8	53 07.1	89.2	53 22.8	87.6	53 37.0	85.9	53 49.9	84.3	40
30	55 05.0	91.9	55 22.0	90.3	55 37.5	88.6	55 51.5	86.8	56 04.2	85.1	30
20	57 19.8	93.2	57 36.7	91.4	57 52.3	89.6	58 06.2	87.8	58 18.5	86.0	20
10	59 34.1	94.5	59 51.6	92.6	60 07.1	90.7	60 20.9	88.8	60 33.2	86.8	10
2 00	61 48.6	96.0	62 06.1	94.0	62 22.1	91.9	62 35.8	89.8	62 47.7	87.6	2 00
1 50	64 02.2	97.6	64 20.5	95.4	64 36.5	93.2	64 50.5	90.9	65 02.5	88.6	1 50
40	66 15.7	99.4	66 34.4	97.1	66 51.1	94.6	67 05.5	92.1	67 17.2	89.6	40
30	68 28.1	101.5	68 48.1	98.9	69 05.4	96.2	69 20.0	93.5	69 32.0	90.7	30
20	70 39.8	103.9	71 00.7	101.1	71 19.2	98.1	71 34.5	95.1	71 46.9	92.0	20
10	72 49.7	106.8	73 12.5	103.7	73 32.0	100.3	73 48.2	96.9	74 01.7	93.4	10
1 00	74 57.7	110.4	75 22.4	106.8	75 44.3	103.0	76 02.1	99.2	76 15.8	95.1	1 00
0 50	77 02.0	114.9	77 30.0	111.0	77 54.2	106.6	78 14.2	102.1	78 30.2	97.3	0 50
40	79 01.2	121.0	79 33.5	116.5	80 01.8	111.5	80 25.3	106.1	80 43.1	100.3	40
30	80 51.5	129.5	81 29.5	124.5	82 04.0	118.5	82 33.0	112.1	82 54.0	104.8	30
20	82 26.5	141.5	83 13.0	136.4	83 55.7	130.2	84 33.1	122.3	85 03.0	112.8	20
10	83 34.4	158.5	84 30.0	154.8	85 23.6	149.8	86 14.1	142.3	86 58.7	130.9	10
0 00	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	88 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 14.8	91.1	1 48.5	92.0	1 22.0	92.9	0 55.7	93.8	0 29.3	94.7	5 50
40	4 29.6	92.2	4 03.1	93.1	3 36.7	94.0	3 10.2	94.9	2 43.6	95.8	40
30	6 44.2	93.3	6 17.7	94.2	5 51.0	95.1	5 24.4	96.0	4 57.5	96.9	30
20	8 58.7	94.4	8 32.1	95.3	8 05.2	96.2	7 38.3	97.1	7 11.2	98.0	20
10	11 13.0	95.5	10 46.2	96.5	10 19.1	97.4	9 51.9	98.3	9 24.6	99.2	10
5 00	13 27.1	96.7	13 00.0	97.6	12 32.6	98.5	12 05.1	99.4	11 37.4	100.3	5 00
4 50	15 40.8	97.9	15 13.4	98.9	14 45.7	99.7	14 17.9	100.6	13 49.8	101.5	4 50
40	17 54.1	99.1	17 26.4	100.0	16 58.4	100.9	16 30.1	101.8	16 01.5	102.8	40
30	20 07.0	100.3	19 38.9	101.2	19 10.4	102.1	18 41.8	103.1	18 12.7	104.0	30
20	22 19.5	101.6	21 50.9	102.5	21 21.9	103.4	20 52.7	104.4	20 23.1	105.3	20
10	24 31.2	102.9	24 02.1	103.8	23 32.7	104.7	23 02.9	105.7	22 32.7	106.6	10
4 00	26 42.3	104.2	26 12.7	105.2	25 42.5	106.1	25 12.2	107.1	24 41.4	108.0	4 00
3 50	28 52.6	105.6	28 22.3	106.6	27 51.6	107.5	27 20.6	108.5	26 49.2	109.5	3 50
40	31 02.0	107.1	30 31.0	108.1	29 59.6	109.0	29 27.9	110.0	28 55.6	111.0	40
30	33 10.3	108.6	32 38.7	109.6	32 06.4	110.6	31 33.9	111.6	31 00.8	112.6	30
20	35 17.5	110.2	34 45.0	111.2	34 12.0	112.2	33 38.5	113.2	33 04.6	114.2	20
10	37 23.3	111.9	36 50.0	112.9	36 16.0	114.0	35 41.7	115.0	35 06.6	115.9	10
3 00	39 27.6	113.7	38 53.2	114.7	38 18.3	115.8	37 42.9	116.8	37 06.8	117.8	3 00
2 50	41 30.2	115.6	40 54.8	116.6	40 18.7	117.7	39 42.2	118.7	39 05.1	119.7	2 50
40	43 30.8	117.6	42 54.1	118.7	42 17.0	119.7	41 39.4	120.8	41 00.9	121.8	40
30	45 29.0	119.7	44 51.2	120.8	44 12.7	121.9	43 33.8	123.0	42 54.1	124.0	30
20	47 24.8	122.1	46 45.6	123.2	46 05.7	124.2	45 25.3	125.3	44 44.3	126.3	20
10	49 17.4	124.5	48 36.8	125.6	47 55.6	126.7	47 13.6	127.8	46 31.2	128.8	10
2 00	51 06.7	127.2	50 24.5	128.3	49 41.6	129.4	48 58.2	130.5	48 14.2	131.5	2 00
1 50	52 52.0	130.1	52 08.1	131.2	51 23.6	132.3	50 38.5	133.4	49 52.9	134.4	1 50
40	54 32.8	133.2	53 47.2	134.3	53 00.8	135.4	52 14.1	136.4	52 26.7	137.4	40
30	56 08.1	136.6	55 20.8	137.7	54 32.6	138.7	53 44.1	139.7	52 55.0	140.7	30
20	57 37.6	140.3	56 48.4	141.3	55 58.4	142.3	55 08.0	143.3	54 17.2	144.2	20
10	59 00.0	144.3	58 08.8	145.3	57 17.0	146.2	56 25.0	147.1	55 32.4	147.9	10
1 00	60 14.8	148.6	59 21.6	149.5	58 28.0	150.4	57 34.2	151.2	56 39.9	152.0	1 00
0 50	61 20.5	153.2	60 25.2	154.0	59 30.0	154.8	58 34.6	155.5	57 38.8	156.2	0 50
40	62 16.1	158.1	61 19.5	158.8	60 22.7	159.5	59 25.7	160.1	58 28.4	160.7	40
30	63 00.7	163.3	62 02.8	163.9	61 04.5	164.4	60 06.2	164.9	59 08.0	165.3	30
20	63 33.4	168.7	62 34.3	169.1	61 35.1	169.4	60 36.0	169.8	59 36.6	170.1	20
10	63 53.3	174.3	62 53.6	174.5	61 53.8	174.7	60 54.0	174.9	59 54.2	175.0	10
0 00	64 0.0	180.0	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50	0 02.9	95.6									5 50
40	2 17.0	96.7	1 50.3	97.6	1 23.6	98.5	0 57.0	99.4	0 30.2	100.3	40
30	4 30.7	97.8	4 03.8	98.7	3 36.9	99.6	3 09.7	100.5	2 42.7	101.4	30
20	6 44.1	98.9	6 16.9	99.8	5 49.5	100.7	5 22.1	101.6	4 54.5	102.5	20
10	8 57.1	100.1	8 29.4	101.0	8 01.8	101.9	7 33.9	102.8	7 05.9	103.7	10
5 00	11 09.6	101.3	10 41.6	102.2	10 13.3	103.1	9 45.1	104.0	9 16.5	104.9	5 00
4 50	13 21.5	102.4	12 53.0	103.3	12 24.4	104.3	11 55.5	105.2	11 26.5	106.1	4 50
40	15 32.8	103.7	15 03.9	104.6	14 34.6	105.5	14 05.3	106.4	13 35.6	107.3	40
30	17 43.5	104.9	17 13.9	105.9	16 44.2	106.8	16 14.2	107.7	15 43.9	108.6	30
20	19 53.3	106.2	19 23.3	107.2	18 52.8	108.1	18 22.2	109.0	17 51.2	109.9	20
10	22 02.2	107.5	21 31.6	108.5	21 00.5	109.4	20 29.1	110.3	19 57.5	111.2	10
4 00	24 10.3	109.0	23 38.9	109.9	23 07.1	110.8	22 35.0	111.8	22 02.5	112.7	4 00
3 50	26 17.2	110.5	25 45.1	111.4	25 12.6	112.3	24 39.6	113.2	24 06.4	114.1	3 50
40	28 23.0	112.0	27 50.0	112.9	27 16.5	113.8	26 42.7	114.8	26 08.4	115.7	40
30	30 27.3	113.6	29 53.3	114.5	29 19.1	115.4	28 44.3	116.4	28 09.3	117.3	30
20	32 30.1	115.2	31 55.3	116.2	31 19.9	117.1	30 44.3	118.1	30 08.1	119.0	20
10	34 31.2	116.9	33 55.4	117.9	33 19.1	118.8	32 42.2	119.8	32 05.1	120.7	10
3 00	36 30.4	118.8	35 53.5	119.8	35 16.0	120.7	34 38.2	121.7	33 59.7	122.6	3 00
2 50	38 27.4	120.7	37 49.2	121.7	37 10.7	122.7	36 31.6	123.7	35 52.1	124.6	2 50
40	40 22.0	122.8	39 42.7	123.8	39 02.8	124.8	38 22.6	125.7	37 41.7	126.6	40
30	42 13.9	125.0	41 33.3	126.0	40 52.2	127.0	40 10.5	127.9	39 28.4	128.8	30
20	44 02.7	127.3	43 20.7	128.3	42 38.2	129.3	41 55.1	130.2	41 11.6	131.2	20
10	45 48.1	129.8	45 04.6	130.8	44 20.7	131.8	43 36.2	132.7	42 51.2	133.6	10
2 00	47 29.6	132.5	46 44.7	133.5	45 59.1	134.4	45 13.1	135.3	44 26.6	136.2	2 00
1 50	49 06.7	135.4	48 20.1	136.3	47 33.1	137.2	46 45.5	138.1	45 57.6	139.0	1 50
40	50 38.9	138.4	49 50.8	139.3	49 02.0	140.2	48 13.0	141.1	47 23.4	141.9	40
30	52 05.5	141.6	51 15.6	142.5	50 25.3	143.4	49 34.7	144.2	48 43.7	145.0	30
20	53. 26.0	145.1	52 34.6	146.0	51 42.5	146.8	50 50.3	147.6	49 57.6	148.3	20
10	54 39.5	148.8	53 46.4	149.6	52 53.0	150.4	51 59.0	151.1	51 05.1	151.8	10
1 00	55 45.4	152.7	54 50.8	153.4	53 55.6	154.1	53 00.5	154.8	52 04.9	155.4	1 00
0 50	56 42.9	156.9	55 46.6	157.5	54 50.4	158.1	53 53.8	158.7	52 57.1	159.2	0 50
40	57 31.1	161.2	56 33.8	161.7	55 36.0	162.2	54 38.5	162.7	53 40.4	163.2	40
30	58 09.5	165.7	57 10.9	166.1	56 12.4	166.5	55 13.6	166.9	54 14.9	167.3	30
20	58 37.4	170.4	57 38.1	170.7	56 38.6	170.9	55 39.3	171.2	54 39.8	171.4	20
10	58 54.4	175.2	57 54.5	175.3	56 54.7	175.4	55 54.8	175.6	54 55.0	175.7	10
0 00	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 03. 5	101. 2									5 40
30	2 15. 5	102. 3	1 48. 3	103. 2	1 21. 2	104. 1	0 54. 0	105. 0	0 26. 8	105. 9	30
20	4 27. 0	103. 4	3 59. 3	104. 3	3 31. 7	105. 2	3 03. 9	106. 1	2 36. 1	107. 0	20
10	6 37. 9	104. 5	6 09. 6	105. 4	5 41. 5	106. 3	5 13. 1	107. 2	4 44. 7	108. 1	10
5 00	8 48. 0	105. 7	8 19. 2	106. 6	7 50. 4	107. 5	7 21. 4	108. 4	6 52. 3	109. 3	5 00
4 50	10 57. 3	106. 9	10 28. 0	107. 8	9 58. 6	108. 7	9 28. 9	109. 6	8 59. 1	110. 5	4 50
40	13 05. 9	108. 2	12 35. 9	109. 1	12 05. 8	110. 0	11 35. 4	110. 8	11 04. 9	111. 7	40
30	15 13. 5	109. 4	14 42. 9	110. 3	14 12. 1	111. 2	13 40. 9	112. 1	13 09. 6	113. 0	30
20	17 20. 1	110. 8	16 48. 7	111. 7	16 17. 1	112. 6	15 45. 3	113. 4	15 13. 1	114. 3	20
10	19 25. 6	112. 1	18 53. 4	113. 0	18 21. 0	113. 9	17 48. 2	114. 8	17 15. 4	115. 7	10
4 00	21 29. 8	113. 6	20 56. 8	114. 5	20 23. 6	115. 4	19 49. 9	116. 2	19 16. 1	117. 1	4 00
3 50	23 32. 7	115. 0	22 58. 9	115. 9	22 24. 6	116. 8	21 50. 1	117. 7	21 15. 6	118. 6	3 50
40	25 34. 1	116. 6	24 59. 2	117. 5	24 24. 1	118. 4	23 48. 6	119. 3	23 12. 8	120. 1	40
30	27 33. 8	118. 2	26 57. 9	119. 1	26 21. 8	120. 0	25 45. 2	120. 9	25 08. 4	121. 7	30
20	29 31 6	119. 9	28 54. 7	120. 8	28 17. 5	121. 7	27 40. 0	122. 6	27 02. 0	123. 4	20
10	31 27. 5	121. 7	30 49. 5	122. 6	30 11. 2	123. 5	29 32. 4	124. 4	28 53. 4	125. 2	10
3 00	33 21. 0	123. 5	32 42. 0	124. 4	32 02. 5	125. 3	31 22. 5	126. 2	31 42. 3	127. 1	3 00
2 50	35 12. 2	125. 5	34 31. 8	126. 4	33 51. 1	127. 3	33 09. 9	128. 1	32 28. 4	129. 0	2 50
40	37 00. 6	127. 6	36 18. 9	128. 5	35 37. 0	129. 4	34 54. 4	130. 2	34 11. 7	131. 1	40
30	38 45. 8	129. 7	38 02. 8	130. 6	37 19. 5	131. 5	36 35. 8	132. 4	35 51. 7	133. 2	30
20	40 27. 7	132. 1	39 43. 4	132. 9	38 58. 7	133. 8	38 13. 6	134. 7	37 28. 1	135. 5	20
10	42 05. 9	134. 5	41 20. 2	135. 4	40 34. 0	136. 2	39 47. 4	137. 1	39 00. 8	137. 9	10
2 00	43 39. 8	137. 1	42 52. 7	138. 0	42 05. 2	138. 8	41 17. 2	139. 6	40 28. 9	140. 4	2 00
1 50	45 09. 3	139. 8	44 20. 5	140. 7	43 31. 5	141. 5	42 42. 1	142. 3	41 52. 5	143. 0	1 50
40	46 33. 6	142. 7	45 43. 4	143. 6	44 53. 0	144. 3	44 02. 1	145. 1	43 10. 9	145. 8	40
30	47 52. 3	145. 8	47 00. 6	146. 6	46 08. 7	147. 3	45 16. 4	148. 0	44 24. 0	148. 7	30
20	49 04. 9	149. 0	48 11. 8	149. 7	47 18. 4	150. 4	46 24. 8	151. 1	45 30. 9	151. 7	20
10	50 10. 7	152. 5	49 16. 2	153. 1	48 21. 6	153. 7	47 26. 6	154. 3	46 31. 5	154. 9	10
1 00	51 09. 4	156. 0	50 13. 6	156. 6	49 17. 6	157. 2	48 21. 6	157. 7	47 25. 1	158. 2	1 00
0 50	52 00. 1	159. 7	51 03. 1	160. 2	50 06. 1	160. 7	49 08. 9	161. 2	48 11. 5	161. 7	0 50
40	52 42. 6	163. 6	51 44. 6	164. 0	50 46. 5	164. 4	49 48. 2	164. 8	48 50. 0	165. 2	40
30	53 16. 1	167. 6	52 17. 3	167. 9	51 18. 3	168 2	50 19. 4	168. 5	49 20. 4	168. 8	30
20	53 40. 5	171. 7	52 40. 9	171. 9	51 41. 5	172. 1	50 41. 9	172. 3	49 42. 3	172. 5	20
10	53 55. 1	175. 8	52 55. 2	175. 9	51 55. 4	176. 0	50 55. 4	176. 1	49 55. 6	176. 2	10
0 00	54 0. 0	180. 0	53 0. 0	180. 0	52 0. 0	180. 0	51 0. 0	180. 0	50 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	2 08. 2	107. 9	1 40. 4	108. 7	1 12. 5	109. 6	0 44. 5	110. 5	0 16. 7	111. 4	5 20
10	4 16. 1	109. 0	3 47. 7	109. 8	3 19. 1	110. 7	2 50. 4	111. 6	2 21. 7	112. 5	10
5 00	6 23. 2	110. 2	5 53. 9	111. 0	5 24. 6	111. 9	4 55. 2	112. 8	4 25. 7	113. 7	5 00
4 50	8 29. 1	111. 4	7 59. 2	112. 2	7 29. 2	113. 1	6 58. 9	114. 0	6 28. 7	114. 8	4 50
40	10 34. 3	112. 6	10 03. 5	113. 5	9 32. 6	114. 3	9 01. 6	115. 2	8 30. 5	116. 0	40
30	12 38. 2	113. 9	12 06. 6	114. 8	11 34. 8	115. 6	11 03. 0	116. 5	10 30. 8	117. 3	30
20	14 40. 9	115. 2	14 08. 4	116. 1	13 35. 8	116. 9	13 02. 9	117. 8	12 29. 9	118. 6	20
10	16 42. 2	116. 6	16 08. 8	117. 4	15 35. 3	118. 3	15 01. 5	119. 1	14 27. 5	120. 0	10
4 00	18 42. 0	118. 0	18 07. 7	118. 8	17 33. 2	119. 7	16 58. 4	120. 5	16 23. 4	121. 4	4 00
3 50	20 40. 2	119. 5	20 05. 0	120. 3	19 29. 5	121. 2	18 53. 7	122. 0	18 17. 7	122. 9	3 50
40	22 36. 7	121. 0	22 00. 4	121. 9	21 23. 8	122. 7	20 46. 9	123. 6	20 09. 8	124. 4	40
30	24 31. 4	122. 6	23 53. 9	123. 5	23 16. 2	124. 3	22 38. 2	125. 2	22 00. 1	126. 0	30
20	26 23. 8	124. 3	25 45. 3	125. 2	25 06. 5	126. 0	24 27. 3	126. 8	23 47. 9	127. 7	20
10	28 14. 0	126. 0	27 34. 4	126. 9	26 54. 3	127. 8	26 14. 1	128. 6	25 33. 5	129. 4	10
3 00	30 01. 7	127. 9	29 20. 8	128. 8	28 39. 6	129. 6	27 58. 0	130. 4	27 16. 2	131. 2	3 00
2 50	31 46. 7	129. 8	31 04. 5	130. 7	30 22. 0	131. 5	29 39. 2	132. 3	28 55. 9	133. 1	2 50
40	33 28. 5	131. 9	32 45. 2	132. 7	32 01. 4	133. 5	31 17. 2	134. 3	30 33. 0	135. 1	40
30	35 07. 1	134. 0	34 22. 3	134. 8	33 37. 4	135. 6	32 52. 1	136. 4	32 06. 4	137. 2	30
20	36 42. 3	136. 3	35 56. 3	137. 1	35 09. 8	137. 9	34 23. 0	138. 6	33 36. 1	139. 4	20
10	38 13. 4	138. 6	37 26. 0	139. 4	36 38. 1	140. 2	35 50. 2	140. 9	35 01. 8	141. 7	10
2 00	39 40. 3	141. 1	38 51. 5	141. 9	38 02. 4	142. 6	37 12. 9	143. 3	36 23. 3	144. 0	2 00
1 50	41 02. 5	143. 8	40 12. 2	144. 6	39 21. 8	145. 2	38 31. 1	145. 8	37 40. 1	146. 5	1 50
40	42 19. 6	146. 5	41 28. 0	147. 2	40 36. 2	147. 8	39 44. 1	148. 5	38 51. 8	149. 1	40
30	43 31. 2	149. 4	42 38. 4	150. 0	41 45. 2	150. 6	40 51. 8	151. 2	39 58. 3	151. 8	30
20	44 36. 9	152. 4	43 42. 8	152. 9	42 48. 4	153. 5	41 53. 8	154. 1	40 59. 0	154. 6	20
10	45 36. 2	155. 5	44 40. 8	156. 0	43 45. 4	156. 6	42 49. 6	157. 1	41 53. 7	157. 5	10
1 00	46 28. 7	158. 7	45 32. 2	159. 2	44 35. 6	159. 7	43 38. 8	160. 1	42 42. 0	160. 5	1 00
0 50	47 13. 0	162. 1	46 16. 5	162. 5	45 19. 0	162. 9	44 21. 2	163. 3	43 23. 3	163. 6	0 50
40	47 51. 6	165. 5	46 53. 3	165. 9	45 54. 8	166. 2	44 56. 3	166. 5	43 57. 8	166. 8	40
30	48 21. 2	169. 1	47 22. 2	169. 3	46 23. 2	169. 6	45 24. 0	169. 8	44 24. 7	170. 0	30
20	48 42. 7	172. 7	47 43. 1	172. 9	46 43. 5	173. 0	45 44. 3	173. 2	44 44. 8	173. 3	20
10	48 55. 7	176. 3	47 55. 8	176. 4	46 55. 9	176. 5	45 56. 0	176. 6	44 56. 1	176. 6	10
0 00	49 0. 0	180. 0	48 0. 0	180. 0	47 0. 0	180. 0	46 0. 0	180. 0	45 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 53.1	113.4	1 24.3	114.3	0 55.6	115.1	0 26.7	116.0			5 10
5 00	3 56.2	114.5	3 26.7	115.4	2 57.0	116.3	2 27.4	117.1	1 57.6	118.0	5 00
4 50	5 58.3	115.7	5 27.8	116.6	4 57.3	117.4	4 26.7	118.3	3 56.0	119.2	4 50
40	7 59.2	116.9	7 27.8	117.8	6 56.3	118.6	6 24.8	119.5	5 53.0	120.4	40
30	9 58.6	118.2	9 26.3	119.0	8 53.9	119.9	8 21.3	120.7	7 48.7	121.6	30
20	11 56.9	119.5	11 23.5	120.3	10 50.1	121.2	10 16.5	122.0	9 42.7	122.8	20
10	13 53.4	120.8	13 19.1	121.7	12 44.7	122.5	12 09.9	123.4	11 35.1	124.2	10
4 00	15 48.3	122.2	15 12.9	123.1	14 37.4	123.9	14 01.7	124.8	13 25.7	125.6	4 00
3 50	17 41.4	123.7	17 05.0	124.6	16 28.3	125.4	15 51.4	126.2	15 14.3	127.0	3 50
40	19 32.6	125.2	18 55.0	126.1	18 17.2	126.9	17 39.3	127.7	17 01.0	128.5	40
30	21 21.6	126.8	20 42.9	127.7	20 03.9	128.5	19 24.7	129.3	18 45.3	130.1	30
20	23 08.4	128.5	22 28.4	129.3	21 48.3	130.2	21 07.9	130.9	20 27.4	131.7	20
10	24 52.6	130.2	24 11.5	131.0	23 30.2	131.8	22 48.6	132.6	22 06.7	133.4	10
3 00	26 34.2	132.0	25 51.9	132.8	25 09.3	133.6	24 26.4	134.4	23 43.3	135.2	3 00
2 50	28 12.8	133.9	27 29.2	134.7	26 45.4	135.5	26 01.2	136.2	25 16.8	137.0	2 50
40	29 48.4	135.9	29 03.5	136.6	28 18.4	137.4	27 32.9	138.1	26 47.2	138.9	40
30	31 20.4	138.0	30 34.2	138.7	29 47.8	139.4	29 01.2	140.1	28 14.2	140.9	30
20	32 48.9	140.1	32 01.3	140.8	31 13.6	141.5	30 25.6	142.2	29 37.4	142.9	20
10	34 13.2	142.4	33 24.5	143.1	32 35.5	143.8	31 46.1	144.4	30 56.7	145.1	10
2 00	35 33.5	144.7	34 43.3	145.4	33 52.9	146.1	33 02.4	146.7	32 11.6	147.4	2 00
1 50	36 48.8	147.2	35 57.5	147.8	35 05.9	148.4	34 14.1	149.0	33 22.0	149.7	1 50
40	37 59.5	149.7	37 06.7	150.3	36 13.9	150.9	35 21.0	151.5	34 27.7	152.1	40
30	39 04.6	152.4	38 10.8	153.0	37 16.8	153.5	36 22.6	154.1	35 28.2	154.6	30
20	40 04.2	155.9	39 09.1	155.7	38 14.1	156.2	37 18.8	156.7	36 23.4	157.2	20
10	40 57.7	158.0	40 01.7	158.5	39 05.5	158.9	38 09.2	159.4	37 12.7	159.9	10
1 00	41 45.0	161.0	40 47.9	161.4	39 50.9	161.8	38 53.6	162.2	37 56.3	162.6	1 00
0 50	42 25.6	164.0	41 27.6	164.4	40 29.7	164.7	39 31.6	165.0	38 33.5	165.4	0 50
40	42 59.3	167.1	42 00.6	167.4	41 01.9	167.7	40 03.2	167.9	39 04.4	168.2	40
30	43 25.7	170.2	42 26.3	170.5	41 27.2	170.7	40 28.0	170.9	39 28.6	171.1	30
20	43 44.8	173.5	42 45.0	173.6	41 45.4	173.8	40 45.8	173.9	39 46.0	174.1	20
10	43 56.2	176.7	42 56.2	176.8	41 56.3	176.9	40 56.4	177.0	39 56.5	177.0	10
0 00	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 27.2	89.1	0 54.5	88.2	1 21.7	87.3	1 48.9	86.4	6 00
5 50	2 13.7	91.1	2 40.9	90.3	3 08.0	89.4	3 35.2	88.5	4 02.4	87.6	5 50
40	4 27.2	92.3	4 54.5	91.4	5 21.8	90.5	5 48.8	89.6	6 15.9	88.7	40
30	6 40.7	93.4	7 08.1	92.5	7 35.3	91.6	8 02.4	90.7	8 29.6	89.8	30
20	8 54.0	94.6	9 21.5	93.7	9 48.9	92.8	10 16.1	91.9	10 43.2	91.0	20
10	11 07.1	95.8	11 34.9	94.9	12 02.3	93.9	12 29.7	93.0	12 56.8	92.1	10
5 00	13 20.0	96.9	13 47.8	96.0	14 15.6	95.1	14 43.0	94.2	15 10.3	93.3	5 00
4 50	15 32.4	98.1	16 00.8	97.2	16 28.5	96.3	16 56.3	95.4	17 23.6	94.5	4 50
40	17 44.6	99.4	18 13.0	98.5	18 41.3	97.5	19 09.1	96.6	19 36.8	95.7	40
30	19 56.2	100.7	20 25.1	99.8	20 53.5	98.8	21 21.8	97.8	21 49.6	96.9	30
20	22 07.2	102.0	22 36.5	101.0	23 05.4	100.1	23 33.9	99.1	24 02.1	98.1	20
10	24 17.6	103.3	24 47.4	102.3	25 16.7	101.4	25 45.7	100.4	26 14.2	99.4	10
4 00	26 27.4	104.7	26 57.5	103.7	27 27.4	102.8	27 56.8	101.8	28 25.8	100.8	4 00
3 50	28 36.2	106.0	29 07.0	105.1	29 37.4	104.2	30 07.4	103.2	30 36.8	102.2	3 50
40	30 44.1	107.6	31 15.5	106.6	31 46.6	105.6	32 17.0	104.6	32 47.1	103.6	40
30	32 50.8	109.2	33 23.1	108.2	33 54.8	107.2	34 25.9	106.1	34 56.6	105.1	30
20	34 56.4	110.9	35 29.4	109.8	36 01.9	108.8	36 33.7	107.7	37 05.1	106.7	20
10	37 00.6	112.6	37 34.5	111.5	38 07.7	110.5	38 40.5	109.4	39 12.5	108.3	10
3 00	39 03.2	114.4	39 37.9	113.4	40 12.2	112.3	40 45.7	111.2	41 18.7	110.1	3 00
2 50	41 03.9	116.4	41 39.8	115.3	42 15.0	114.2	42 49.6	113.1	43 23.5	112.0	2 50
40	43 02.6	118.4	43 39.5	117.3	44 15.9	116.2	44 51.6	115.1	45 26.6	114.0	40
30	44 58.8	120.6	45 37.3	119.5	46 14.6	118.4	46 51.6	117.3	47 27.7	116.1	30
20	46 52.5	123.0	47 32.0	121.9	48 10.9	120.7	48 49.1	119.6	49 26.5	118.4	20
10	48 43.0	125.5	49 24.0	124.4	50 04.2	123.2	50 44.0	122.0	51 22.8	120.8	10
2 00	50 30.1	128.2	51 12.5	127.1	51 54.4	125.9	52 35.5	124.7	53 15.9	123.5	2 00
1 50	52 12.9	131.1	52 57.2	130.0	53 40.6	128.8	54 23.4	127.6	55 05.5	126.4	1 50
40	53 51.3	134.2	54 37.1	133.1	55 22.5	132.0	56 06.9	130.8	56 50.9	129.6	40
30	55 24.1	137.6	56 12.1	136.5	56 59.0	135.4	57 45.6	134.2	58 31.5	133.0	30
20	56 51.2	141.3	57 40.6	140.3	58 29.8	139.2	59 18.2	138.0	60 06.0	136.8	20
10	58 11.0	145.2	59 02.8	144.2	59 53.5	143.2	60 44.0	142.1	61 33.9	141.0	10
1 00	59 23.4	149.5	60 16.6	148.6	61 09.6	147.6	62 02.0	146.6	62 54.0	145.5	1 00
0 50	60 26.7	154.0	61 21.9	153.2	62 16.5	152.3	63 10.9	151.4	64 04.9	150.4	0 50
40	61 20.4	158.8	62 16.9	158.1	63 13.6	157.4	64 09.6	156.6	65 05.6	155.7	40
30	62 03.2	163.8	63 01.2	163.3	63 59.1	162 7	64 56.9	162.1	65 54.5	161.4	30
20	62 34.5	169.1	63 33.6	168.7	64 32.8	168.3	65 31.6	167.9	66 30.4	167.4	20
10	62 53.6	174.5	63 53.4	174.3	64 53.1	174.1	65 53.0	173.9	66 52.6	173.6	10
0 00	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 02.8	84.4	0 30.3	83.5	0 57.6	82.6	1 24.9	81.7	1 52.2	80.9	6 10
6 00	2 16.1	85.6	2 43.2	84.7	3 10.3	83.8	3 37.4	82.9	4 04.4	82.0	6 00
5 50	4 29.4	86.7	4 56.4	85.8	5 23.3	84.9	5 50.2	84.0	6 16.9	83.1	5 50
40	6 42.9	87.8	7 09.7	86.9	7 36.5	86.0	8 03.2	85.1	8 29.7	84.2	40
30	8 56.5	88.9	9 23.2	88.0	9 49.9	87.1	10 16.4	86.2	10 42.7	85.3	30
20	11 10.1	90.1	11 36.8	89.1	12 03.5	88.2	12 29.9	87.3	12 56.2	86.4	20
10	13 23.8	91.2	13 50.6	90.2	14 17.2	89.3	14 43.4	88.4	15 09.6	87.5	10
5 00	15 37.3	92.3	16 04.2	91.4	16 30.7	90.5	16 57.0	89.5	17 23.2	88.6	5 00
4 50	17 50.8	93.5	18 17.8	92.6	18 44.4	91.6	19 10.7	90.7	19 36.8	89.7	4 50
40	20 04.1	94.7	20 31.1	93.8	20 57.9	92.8	21 24.3	91.8	21 50.5	90.9	40
30	22 17.2	95.9	22 44.4	95.0	23 11.3	94.0	23 37.9	93.0	24 04.0	92.0	30
20	24 30.0	97.2	24 57.4	96.2	25 24.6	95.2	25 51.2	94.2	26 17.6	93.2	20
10	26 42.4	98.5	27 10.2	97.5	27 37.5	96.4	28 04.4	95.4	28 30.8	94.4	10
4 00	28 54.4	99.8	29 22.4	98.8	29 50.1	97.7	30 17.3	96.7	30 44.1	95.6	4 00
3 50	31 05.8	101.1	31 34.3	100.1	32 02.4	99.1	32 29.9	98.0	32 56.8	97.0	3 50
40	33 16.6	102.6	33 45.5	101.5	34 14.1	100.5	34 41.9	99.4	35 09.4	98.3	40
30	35 26.7	104.1	35 56.2	103.0	36 25.3	101.9	36 53.6	100.8	37 21.3	99.7	30
20	37 35.8	105.6	38 06.0	104.5	38 35.7	103.4	39 04.5	102.3	39 32.8	101.1	20
10	39 44.1	107.2	40 15.0	106.1	40 45.2	105.0	41 14.7	103.9	41 43.5	102.7	10
3 00	41 51.1	109.0	42 22.7	107.8	42 53.8	106.7	43 24.0	105.5	43 53.6	104.3	3 00
2 50	43 56.8	110.8	44 29.2	109.5	45 01.2	108.4	45 32.3	107.2	46 02.6	106.0	2 50
40	46 00.8	112.8	46 34.4	111.5	47 07.3	110.3	47 39.2	109.1	48 10.5	107.8	40
30	48 03.2	114.9	48 37.9	113.7	49 11.7	112.4	49 44.7	111.1	50 16.9	109.8	30
20	50 03.2	117.1	50 39.1	115.9	51 14.3	114.6	51 48.6	113.3	52 21.9	111.9	20
10	52 01.0	119.5	52 38.2	118.3	53 14.7	117.0	53 50.2	115.6	54 24.9	114.2	10
2 00	53 55.6	122.2	54 34.4	120.9	55 12.4	119.6	55 49.3	118.2	56 25.5	116.7	2 00
1 50	55 46.9	125.1	56 27.4	123.8	57 07.0	122.4	57 45.7	121.0	58 23.4	119.5	1 50
40	57 34.0	128.3	58 16.2	126.9	58 57.8	125.5	59 38.3	124.1	60 18.0	122.6	40
30	59 16.5	131.7	60 00.8	130.4	60 44.2	129.0	61 26.7	127.6	62 08.2	126.0	30
20	60 53.2	135.5	61 39.4	134.2	62 25.2	132.8	63 09.8	131.4	63 53.9	129.9	20
10	62 23.2	139.8	63 11.8	138.5	63 59.7	137.1	64 46.8	135.7	65 33.2	134.2	10
1 00	63 45.5	144.3	64 36.2	143.1	65 26.7	141.8	66 16.2	140.4	67 05.2	139.0	1 00
0 50	64 58.2	149.4	65 51.8	148.2	66 44.5	147.0	67 36.2	145.8	68 28.0	144.4	0 50
40	66 01.3	154.8	66 56.5	153.8	67 51.6	152.8	68 46.0	151.7	69 40.2	150.4	40
30	66 51.9	160.7	67 49.2	159.9	68 46.2	159.0	69 43.0	158.1	70 39.3	157.0	30
20	67 29.3	166.9	68 28.0	166.4	69 26.6	165.7	70 25.0	165.1	71 23.6	164.3	20
10	67 52.3	173.4	68 52.0	173.1	69 51.6	172.8	70 51.2	172.4	71 50.8	172.0	10
0 00	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20	0 08.1	78.8	0 35.8	78.0	1 03.4	77.0	1 30.9	76.2	1 58.6	75.3	6 20
10	2 19.4	80.0	2 46.7	79.1	3 13.9	78.2	3 41.1	77.3	4 08.1	76.4	10
6 00	4 31.3	81.1	4 58.2	80.2	5 25.0	79.3	5 51.7	78.4	6 18.3	77.5	6 00
5 50	6 43.6	82.2	7 10.0	81.3	7 36.6	80.4	8 02.9	79.5	8 29.1	78.6	5 50
40	8 56.0	83.3	9 22.3	82.4	9 48.5	81.5	10 14.5	80.5	10 40.3	79.6	40
30	11 08.9	84.4	11 34.9	83.5	12 00.8	82.6	12 26.5	81.6	12 51.9	80.7	30
20	13 22.0	85.5	13 47.9	84.5	14 13.5	83.6	14 38.9	82.7	15 04.1	81.7	20
10	15 35.4	86.6	16 01.1	85.6	16 26.4	84.7	16 51.7	83.8	17 16.5	82.8	10
5 00	17 48.8	87.7	18 14.4	86.7	18 39.6	85.8	19 04.6	84.8	19 29.2	83.8	5 00
4 50	20 02.4	88.8	20 27.9	87.8	20 53.0	86.8	21 17.8	85.9	21 42.1	84.9	4 50
40	22 16.0	89.9	22 41.5	88.9	23 06.5	87.9	23 31.2	86.9	23 55.4	85.9	40
30	24 29.7	91.0	24 55.2	90.0	25 20.2	89.0	25 44.7	88.0	26 08.8	87.0	30
20	26 43.3	92.2	27 08.7	91.2	27 33.8	90.2	27 58.4	89.1	28 22.4	88.1	20
10	28 56.8	93.4	29 22.3	92.3	29 47.4	91.3	30 11.9	90.3	30 35.9	89.2	10
4 00	31 10.1	94.6	31 35.9	93.5	32 01.0	92.5	32 25.6	91.4	32 49.6	90.3	4 00
3 50	33 23.3	95.9	33 49.1	94.8	34 14.5	93.7	34 39.1	92.6	35 03.1	91.5	3 50
40	35 36.0	97.2	36 02.2	96.1	36 27.7	95.0	36 52.6	93.8	37 16.8	92.7	40
30	37 48.4	98.6	38 14.9	97.4	38 40.7	96.3	39 05.8	95.1	39 30.1	93.9	30
20	40 00.2	100.0	40 27.2	98.8	40 53.4	97.6	41 18.8	96.4	41 43.5	95.2	20
10	42 11.6	101.5	42 39.0	100.3	43 05.5	99.0	43 31.3	97.8	43 56.4	96.5	10
3 00	44 22.2	103.1	44 50.2	101.8	45 17.3	100.6	45 43.7	99.3	46 09.0	98.0	3 00
2 50	46 32.0	104.7	47 00.5	103.4	47 28.3	102.2	47 55.1	100.8	48 21.1	99.5	2 50
40	48 40.7	106.5	49 10.1	105.2	49 38.6	103.8	50 06.2	102.5	50 32.6	101.1	40
30	50 48.2	108.5	51 18.4	107.1	51 47.8	105.7	52 16.1	104.3	52 43.4	102.8	30
20	52 54.1	110.5	53 25.5	109.1	53 55.9	107.7	54 25.2	106.2	54 53.2	104.6	20
10	54 58.4	112.8	55 30.9	111.3	56 02.4	109.8	56 32.9	108.2	57 01.9	106.5	10
2 00	57 00.4	115.2	57 34.4	113.7	58 07.2	112.2	58 39.0	110.6	59 09.3	108.9	2 00
1 50	59 00.0	118.0	59 35.5	116.4	60 09.7	114.8	60 42.9	113.1	61 14.6	111.4	1 50
40	60 56.2	121.1	61 33.6	119.4	62 09.7	117.7	62 44.6	116.0	63 18.0	114.1	40
30	62 48.7	124.4	63 28.0	122.7	64 06.2	121.0	64 43.1	119.2	65 18.5	117.3	30
20	64 36.4	128.2	65 17.9	126.5	65 58.5	124.8	66 37.7	122.9	67 15.4	120.9	20
10	66 18.4	132.5	67 02.4	130.8	67 45.4	129.0	68 27.4	127.1	69 07.2	125.0	10
1 00	67 52.8	137.4	68 39.7	135.7	69 25.8	133.9	70 10.4	131.9	70 53.7	129.9	1 00
0 50	69 18.6	142.9	70 08.6	141.2	70 57.2	139.5	71 45.2	137.6	72 31.8	135.6	0 50
40	70 33.3	149.1	71 26.2	147.6	72 18.2	146.0	73 09.8	144.2	73 59.7	142.3	40
30	71 35.2	156.0	72 30.7	154.7	73 25.7	153.4	74 20.2	151.8	75 13.8	150.2	30
20	72 21.4	163.6	73 19.4	162.6	74 17.0	161.7	75 14.5	160.5	76 11.1	159.3	20
10	72 50.3	171.6	73 49.6	171.1	74 49.0	170.6	75 48.3	170.0	76 47.5	169.3	10
0 00	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 05.2	68.6	6 40
30	0 18.0	73.3	0 45.9	72.4	1 13.9	71.5	1 42.1	70.6	2 10.1	69.7	30
20	2 26.2	74.4	2 53.7	73.5	3 21.2	72.6	3 48.6	71.7	4 15.9	70.8	20
10	4 35.2	75.5	5 02.1	74.6	5 29.0	73.7	5 55.9	72.8	6 22.5	71.9	10
6 00	6 44.9	76.6	7 11.3	75.7	7 37.7	74.8	8 03.9	73.9	8 30.0	73.0	6 00
5 50	8 55.1	77.6	9 21.1	76.7	9 46.9	75.8	10 12.6	74.9	10 38.1	74.0	5 50
40	11 05.9	78.7	11 31.4	77.8	11 56.8	76.9	12 21.9	75.9	12 47.0	75.0	40
30	13 17.2	79.8	13 42.3	78.8	14 07.1	77.9	14 31.6	76.9	14 56.2	76.0	30
20	15 28.9	80.8	15 53.6	79.8	16 18.1	78.9	16 42.3	77.9	17 06.2	77.0	20
10	17 41.1	81.8	18 05.4	80.8	18 29.4	79.9	18 53.1	78.9	19 16.6	78.0	10
5 00	19 53.5	82.9	20 17.5	81.9	20 41.2	80.9	21 04.6	79.9	21 27.6	78.9	5 00
4 50	22 06.2	83.9	22 30.0	82.9	22 53.3	81.9	23 16.4	80.9	23 39.0	79.9	4 50
40	24 19.3	84.9	24 42.8	83.9	25 05.8	82.9	25 28.5	81.9	25 50.8	80.8	40
30	26 32.6	86.0	26 55.8	84.9	27 18.6	83.9	27 40.9	82.9	28 03.5	81.8	30
20	28 45.9	87.0	29 09.0	86.0	29 31.6	84.9	29 53.7	83.9	30 15.3	82.8	20
10	30 59.4	88.1	31 22.4	87.1	31 44.8	86.0	32 06.6	84.9	32 28.0	83.7	10
4 00	33 13.0	89.2	33 35.9	88.1	33 58.3	87.0	34 19.9	85.9	34 41.0	84.7	4 00
3 50	35 26.7	90.4	35 49.5	89.2	36 11.8	88.1	36 33.8	86.9	36 54.2	85.7	3 50
40	37 40.3	91.5	38 03.2	90.3	38 25.4	89.2	38 46.8	88.0	39 07.6	86.8	40
30	39 54.0	92.7	40 16.8	91.5	40 38.9	90.3	41 00.4	89.1	41 21.0	87.8	30
20	42 07.3	94.0	42 30.4	92.7	42 52.6	91.5	43 14.1	90.2	43 34.7	88.9	20
10	44 20.5	95.3	44 43.8	94.0	45 06.1	92.7	45 27.7	91.4	45 48.2	90.0	10
3 00	46 33.4	96.6	46 57.0	95.3	47 19.6	93.9	47 41.3	92.6	48 01.9	91.2	3 00
2 50	48 45.9	98.1	49 09.9	96.7	49 32.8	95.3	49 54.7	93.8	50 15.4	92.4	2 50
40	50 58.1	99.6	51 22.5	98.2	51 45.8	96.7	52 07.9	95.2	52 29.0	93.6	40
30	53 09.4	101.3	53 34.5	99.8	53 58.2	98.2	54 20.8	96.6	54 42.2	95.0	30
20	55 20.2	103.1	55 45.9	101.5	56 10.3	99.8	56 33.5	98.2	56 55.3	96.5	20
10	57 29.7	105.0	57 56.4	103.3	58 21.6	101.6	58 45.5	99.9	59 07.9	98.1	10
2 00	59 38.2	107.2	60 05.8	105.4	60 32.0	103.6	60 56.7	101.7	61 19.9	99.8	2 00
1 50	61 45.0	109.6	62 14.1	107.7	62 41.2	105.8	63 07.0	103.8	63 31.0	101.7	1 50
40	63 49.9	112.2	64 20.3	110.3	64 49.2	108.2	65 16.3	106.1	65 41.6	103.9	40
30	65 52.4	115.3	66 24.5	113.2	66 55.0	111.0	67 23.8	108.8	67 50.2	106.4	30
20	67 51.4	118.8	68 25.8	116.6	68 58.5	114.3	69 29.1	111.9	69 57.8	109.3	20
10	69 46.2	122.9	70 23.2	120.5	70 58.2	118.1	71 31.5	115.5	72 02.5	112.7	10
1 00	71 35.3	127.7	72 15.5	125.2	72 53.7	122.7	73 30.0	119.9	74 03.9	117.0	1 00
0 50	73 17.0	133.4	74 00.8	130.9	74 42.5	128.3	75 22.5	125.3	76 00.0	122.2	0 50
40	74 48.7	140.1	75 36.4	137.8	76 22.5	135.2	77 06.7	132.2	77 48.9	128.9	40
30	76 07.0	148.2	76 58.5	146.1	77 49.5	143.7	78 39.0	140.8	79 26.5	137.7	30
20	77 07.7	157.8	78 03.5	156.0	78 58.8	154.2	79 53.2	151.8	80 46.2	149.1	20
10	77 46.6	168.5	78 45.5	167.6	79 44.2	166.5	80 42.6	165.1	81 40.6	163.5	10
0 00	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40	0 34.0	67.7	1 02.8	66.9	1 31.5	66.0	2 00.2	65.1	2 28.9	64.2	6 40
30	2 38.1	68.8	3 06.1	68.0	3 34.1	67.1	4 01.9	66.2	4 29.8	65.3	30
20	4 43.2	69.9	5 10.5	69.1	5 37.7	68.2	6 04.8	67.3	6 31.8	66.4	20
10	6 49.2	71.0	7 15.7	70.1	7 42.2	69.2	8 08.4	68.3	8 34.6	67.4	10
6 00	8 56.0	72.0	9 21.8	71.1	9 47.5	70.2	10 13.0	69.3	10 38.5	68.4	6 00
5 50	11 03.4	73.1	11 28.6	72.1	11 53.6	71.2	12 18.3	70.3	12 43.1	69.4	5 50
40	13 11.6	74.1	13 36.2	73.1	14 00.5	72.2	14 24.6	71.2	14 48.5	70.3	40
30	15 20.3	75.0	15 44.4	74.1	16 08.1	73.2	16 31.5	72.2	16 54.6	71.2	30
20	17 29.8	76.0	17 53.2	75.1	18 16.3	74.1	18 39.1	73.1	19 01.6	72.1	20
10	19 39.8	77.0	20 02.6	76.0	20 25.1	75.0	20 47.2	74.0	21 09.0	73.0	10
5 00	21 50.2	77.9	22 12.6	76.9	22 34.5	75.9	22 56.0	74.9	23 17.1	73.9	5 00
4 50	24 01.2	78.9	24 22.9	77.8	24 44.3	76.8	25 05.3	75.8	25 25.8	74.8	4 50
40	26 12.5	79.8	26 33.9	78.8	26 54.7	77.7	27 15.1	76.7	27 35.0	75.6	40
30	28 24.2	80.7	28 45.1	79.7	29 05.6	78.6	29 25.3	77.6	29 44.7	76.5	30
20	30 36.3	81.7	30 56.8	80.6	31 16.8	79.5	31 36.1	78.4	31 54.9	77.3	20
10	32 48.6	82.6	33 08.7	81.5	33 28.2	80.4	33 47.1	79.2	34 05.3	78.1	10
4 00	35 01.4	83.6	35 21.2	82.4	35 40.3	81.3	35 58.6	80.1	36 16.4	79.0	4 00
3 50	37 14.2	84.6	37 33.7	83.4	37 52.5	82.2	38 10.5	81.0	38 27.7	79.8	3 50
40	39 27.5	85.6	39 46.7	84.3	40 05.1	83.1	40 22.7	81.8	40 39.4	80.6	40
30	41 40.7	86.6	41 59.8	85.3	42 17.8	84.0	42 35.1	82.7	42 51.4	81.4	30
20	43 54.3	87.6	44 13.1	86.3	44 30.9	84.9	44 47.7	83.6	45 03.7	82.3	20
10	46 07.9	88.6	46 26.5	87.3	46 44.1	85.9	47 00.6	84.5	47 16.2	83.1	10
3 00	48 21.5	89.7	48 40.1	88.3	48 57.5	86.9	49 13.8	85.4	49 29.0	83.9	3 00
2 50	50 35.1	90.9	50 53.6	89.4	51 11.0	87.9	51 27.1	86.3	51 42.0	84.8	2 50
40	52 48.7	92.1	53 07.3	90.5	53 24.6	88.9	53 40.5	87.3	53 55.3	85.7	40
30	55 02.2	93.4	55 20.9	91.7	55 38.2	90.0	55 54.1	88.3	56 08.5	86.6	30
20	57 15.6	94.7	57 34.5	93.0	57 51.9	91.2	58 07.7	89.4	58 22.0	87.6	20
10	59 28.6	96.2	59 47.7	94.4	60 05.5	92.4	60 21.4	90.5	60 35.6	88.5	10
2 00	61 41.3	97.8	62 01.0	95.8	62 18.9	93.8	62 34.9	91.7	62 49.2	89.6	2 00
1 50	63 53.3	99.6	64 13.7	97.5	64 32.2	95.3	64 48.5	93.1	65 02.7	90.7	1 50
40	66 04.7	101.7	66 26.0	99.3	66 45.1	97.0	67 01.8	94.5	67 16.5	92.0	40
30	68 15.0	104.0	68 37.4	101.4	68 57.2	98.8	69 15.0	96.2	69 29.9	93.4	30
20	70 23.9	106.7	70 47.8	103.9	71 09.0	101.0	71 27.7	98.0	71 43.2	95.1	20
10	72 30.7	109.8	72 56.7	106.8	73 19.7	103.6	73 39.5	100.3	73 56.0	96.9	10
1 00	74 35.0	113.8	75 03.5	110.5	75 28.5	106.8	75 50.3	103.1	76 08.4	99.2	1 00
0 50	76 35.0	118.8	77 07.0	115.1	77 35.2	110.9	77 59.5	106.7	78 19.5	102.1	0 50
40	78 28.4	125.3	79 04.8	121.2	79 37.5	116.6	80 05.6	111.6	80 29.5	106.1	40
30	80 11.5	133.9	80 53.5	129.6	81 33.0	124.6	82 07.0	118.9	82 35.5	112.1	30
20	81 37.9	145.7	82 27.5	141.7	83 14.5	136.6	83 57.4	130.4	84 34.9	122.5	20
10	82 38.1	161.4	83 34.8	158.6	84 30.5	155.0	85 24.1	149.9	86 14.8	142.5	10
0 00	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	87 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 13.7	91.1	1 46.4	92.0	1 19.0	92.9	0 51.8	93.8	0 24.4	94.7	5 50
40	4 27.2	92.3	3 59.9	93.2	3 32.5	94.1	3 05.0	95.0	2 37.5	95 8	40
30	6 40.7	93.4	6 13.2	94.3	5 45.7	95.2	5 17.9	96.1	4 50.2	97.0	30
20	8 54.0	94.6	8 26.4	95.5	7 58.7	96.4	7 30.7	97.3	7 02.8	98.2	20
10	11 07.1	95.8	10 39.3	96.7	10 11.3	97.6	9 43.2	98.5	9 14.8	99.4	10
5 00	13 20.0	96.9	12 51.8	97.9	12 23.6	98.8	11 55.1	99.7	11 26.6	100.6	5 00
4 50	15 32.4	98.1	15 04.1	99.1	14 35.5	100.0	14 06.8	100.9	13 37.6	101.8	4 50
40	17 44.6	99.4	17 15.9	100.3	16 46.9	101.2	16 17.6	102.1	15 48.2	103.0	40
30	19 56.2	100.7	19 27.1	101.6	18 57.7	102.5	18 27.9	103.4	17 58.0	104.3	30
20	22 07.2	102.0	21 37.7	102.9	21 07.8	103.8	20 37.6	104.8	20 07.1	105.7	20
10	24 17.6	103.3	23 47.6	104.3	23 17.2	105.2	22 46.4	106.2	22 15.3	107.1	10
4 00	26 27.4	104.7	25 56.7	105.7	25 25.7	106.6	24 54.3	107.6	24 22.7	108.5	4 00
3 50	28 36.2	106.0	28 04.8	107.1	27 33.4	108.1	27 01.3	109.1	26 28.8	110.0	3 50
40	30 44.1	107.6	30 12.1	108.6	29 39.8	109.6	29 07.0	110.6	28 33.9	111.5	40
30	32 50.8	109.2	32 18.2	110.2	31 45.1	111.2	31 11.5	112.2	30 37.5	113.1	30
20	34 56.4	110.9	34 23.0	111.9	33 49.0	112.9	33 14.5	113.9	32 39.6	114.8	20
10	37 00.6	112.6	36 26.2	113.6	35 51.3	114.6	35 16.0	115.6	34 40.0	116.6	10
3 00	39 03.2	114.4	38 27.8	115.5	37 52.0	116.5	37 15.5	117.5	36 38.6	118.5	3 00
2 50	41 03.9	116.4	40 27.5	117.4	39 50.5	118.4	39 13.0	119.4	38 24.9	120.4	2 50
40	43 02.6	118.4	42 25.0	119 5	41 46.9	120.5	41 08.2	121.5	40 29.0	122.5	40
30	44 58.8	120.6	44 20.2	121.7	43 40.7	122.8	43 00.8	123.8	42 20.2	124.8	30
20	46 52.5	123.0	46 12.5	124.1	45 31.6	125.1	44 50.2	126.1	43 08.4	127.1	20
10	48 43.0	125.5	48 01.4	126.6	47 19.2	127.6	46 36.5	128.6	45 53.2	129.6	10
2 00	50 30.1	128.2	49 46.9	129.3	49 03.2	130.3	48 18.9	131.3	47 34.1	132.3	2 00
1 50	52 12.9	131.1	51 28.2	132.2	50 42.9	133.2	49 57.0	134.2	49 10.6	135.2	1 50
40	53 51.3	134.2	53 04.8	135.3	52 17.9	136.3	51 30.2	137.3	50 42.3	138.3	40
30	55 24.1	137.6	54 36.1	138.7	53 47.2	139.7	52 58.1	140.6	52 08.4	141.5	30
20	56 51.2	141.3	56 01.1	142.3	55 10.6	143.2	54 19.6	144.1	53 28.3	145.0	20
10	58 11.0	145.2	57 19.4	146.2	56 27.0	147.1	55 34.4	147.9	54 41.2	148.7	10
1 00	59 23.4	149.5	58 29.7	150.3	57 35.7	151.1	56 41.3	151.9	55 46.8	152.7	1 00
0 50	60 26.7	154.0	59 31.2	154.7	58 35.8	155.5	57 39.8	156.2	56 43.8	156.8	0 50
40	61 20.4	158.8	60 23.5	159.4	59 26.4	160.1	58 29.0	160.6	57 31.8	161.2	40
30	62 03.2	163.8	61 05.0	164.3	60 06.8	164.8	59 08.2	165.3	58 09.9	165.7	30
20	62 34.5	169.1	61 35.3	169.4	60 36.1	169.8	59 36.8	170.1	58 37.5	170.4	20
10	62 53.6	174.5	61 53.9	174.7	60 54.1	174.9	59 54.2	175.0	58 54.4	175.2	10
0 00	63 0.0	180.0	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 09.9	96.7	1 42.3	97.6	1 14.8	98.5	0 47.1	99.4	0 19.6	100.3	5 40
30	4 22.5	97.9	3 54.7	98.8	3 26.7	99.7	2 58.8	100.5	2 30.8	101.4	30
20	6 34.7	99.1	6 06.5	99.9	5 38.3	100.8	5 09.9	101.7	4 41.6	102.6	20
10	8 46.5	100.2	8 18.0	101.1	7 49.4	102.0	7 20.5	102.9	6 51.6	103.8	10
5 00	10 57.7	101.4	10 28.8	102.3	9 59.7	103.2	9 30.4	104.1	9 01.2	105.0	5 00
4 50	13 08.4	102.7	12 39.2	103.6	12 09.4	104.5	11 39.8	105.4	11 09.9	106.2	4 50
40	15 18.5	103.9	14 48.5	104.8	14 18.5	105.7	13 48.2	106.6	13 17.8	107.5	40
30	17 27.8	105.3	16 57.4	106.2	16 26.7	107.1	15 55.9	107.9	15 24.7	108.8	30
20	19 36.4	106.6	19 05.3	107.5	18 34.1	108.4	18 02.5	109.3	17 30.8	110.2	20
10	21 44.0	108.0	21 12.3	108.9	20 40.3	109.8	20 08.2	110.7	19 35.6	111.6	10
4 00	23 50.6	109.4	23 18.2	110.3	22 45.6	111.2	22 12.5	112.1	21 39.3	113.0	4 00
3 50	25 56.1	110.9	25 23.0	111.8	24 49.6	112.7	24 15.8	113.6	23 41.5	114.5	3 50
40	28 00.3	112.5	27 26.3	113.4	26 52.1	114.3	26 17.3	115.2	25 42.4	116.1	40
30	30 03.1	114.1	29 28.2	115.0	28 53.1	116.0	28 17.5	116.9	27 41.5	117.8	30
20	32 04.3	115.8	31 28.5	116.7	30 52.4	117.7	30 15.7	118.6	29 38.9	119.5	20
10	34 03.8	117.6	33 27.1	118.5	32 49.8	119.4	32 12.2	120.4	31 34.1	121.3	10
3 00	36 01.2	119.4	35 23.3	120.4	34 45.1	121.3	34 06.3	122.3	33 27.3	123.2	3 00
2 50	37 56.4	121.4	37 17.5	122.4	36 38.0	123.3	35 58.2	124.3	35 17.8	125.2	2 50
40	39 49.2	123.5	39 08.9	124.5	38 28.4	125.4	37 47.2	126.4	37 05.7	127.3	40
30	41 39.1	125.8	40 57.8	126.7	40 15.7	127.6	39 33.3	128.6	38 50.5	129.5	30
20	43 26.0	128.1	42 43.1	129.1	41 59.9	130.0	41 16.1	130.9	40 32.0	131.8	20
10	45 09.4	130.6	44 25.1	131.6	43 40.4	132.5	42 55.2	133.4	42 09.6	134.3	10
2 00	46 48.9	133.3	46 03.0	134.2	45 16.8	135.1	44 30.1	136.0	43 43.2	136.9	2 00
1 50	48 23.8	136.2	47 36.5	137.1	46 48.8	138.0	46 00.7	138.8	45 12.1	139.7	1 50
40	49 53.8	139.2	49 04.8	140.1	48 15.7	141.0	47 25.9	141.8	46 36.1	142.6	40
30	51 18.2	142.4	50 27.9	143.3	49 37.0	144.1	48 45.8	144.9	47 54.2	145.7	30
20	52 36.6	145.9	51 44.4	146.7	50 52.2	147.5	49 59.4	148.2	49 06.6	148.9	20
10	53 48.0	149.5	52 54.4	150.3	52 00.5	151.0	51 06.4	151.7	50 12.1	152.4	10
1 00	54 52.0	153.4	53 56.7	154.1	53 01.6	154.7	52 06.0	155.3	51 10.5	155.9	1 00
0 50	55 47.5	157.4	54 51.1	158.0	53 54.6	158.6	52 57.8	159.1	52 00.9	159.7	0 50
40	56 34.3	161.7	55 36.5	162.2	54 38.9	162.7	53 40.9	163.1	52 43.1	163.6	40
30	57 11.2	166.1	56 12.8	166.5	55 14.0	166.9	54 15.3	167.2	53 16.4	167.5	30
20	57 38.2	170.7	56 38.8	170.9	55 39.5	171.2	54 39.9	171.4	53 40.6	171.6	20
10	57 54.6	175.4	56 54.7	175.5	55 54.9	175.6	54 55.0	175.7	53 55.1	175.8	10
0 00	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	2 02.7	102.3	1 34.7	103.2	1 06.6	104.1	0 38.4	105.0	0 10.3	105.9	5 30
20	4 13.0	103.5	3 44.5	104.4	3 15.9	105.2	2 47.2	106.1	2 18.6	107.0	20
10	6 22.7	104.7	5 53.7	105.6	5 24.4	106.4	4 55.2	107.3	4 26.0	108.2	10
5 00	8 31.6	105.9	8 02.0	106.8	7 32.3	107.6	7 02.5	108.5	6 32.5	109.4	5 00
4 50	10 39.7	107.1	10 09.6	108.0	9 39.2	108.9	9 08.8	109.8	8 38.1	110.6	4 50
40	12 47.0	108.4	12 16.2	109.3	11 45.2	110.2	11 14.0	111.0	10 42.7	111.9	40
30	14 53.4	109.7	14 21.9	110.6	13 50.2	111.5	13 18.1	112.3	12 46.1	113.2	30
20	16 58.6	111.1	16 26.4	112.0	15 53.9	112.8	15 21.3	113.7	14 48.4	114.6	20
10	19 02.8	112.5	18 29.8	113.4	17 56.5	114.2	17 22.9	115.1	16 49.1	116.0	10
4 00	21 05.6	113.9	20 31.8	114.8	19 57.7	115.7	19 23.3	116.6	18 48.6	117.4	4 00
3 50	23 07.2	115.4	22 32.4	116.3	21 57.4	117.2	21 22.0	118.1	20 46.4	118.9	3 50
40	25 07.0	117.0	24 31.4	117.9	23 55.4	118.8	23 19.1	119.7	22 42.6	120.5	40
30	27 05.3	118.7	26 28.6	119.5	25 51.6	120.4	25 14.2	121.3	24 36.7	122.1	30
20	29 01.5	120.4	28 23.8	121.2	27 45.8	122.1	27 07.5	123.0	26 28.8	123.9	20
10	30 55.8	122.2	30 17.0	123.1	29 37.8	124.0	28 58.3	124.8	28 18.6	125.7	10
3 00	32 47.7	124.1	32 07.8	125.0	31 27.5	125.8	30 46.9	126.7	29 05.9	127.6	3 00
2 50	34 37.2	126.1	33 56.0	126.9	33 14.5	127.8	32 32.6	128.7	31 50.5	129.5	2 50
40	36 23.7	128.2	35 41.4	129.0	34 58.6	129.9	34 15.6	130.8	33 32.1	131.6	40
30	38 07.3	130.4	37 23.6	131.2	36 39.5	132.1	35 55.1	132.9	35 10.4	133.7	30
20	39 47.2	132.7	39 02.3	132.5	38 16.9	134.4	37 31.2	135.2	36 45.2	136.0	20
10	41 23.5	135.2	40 37.2	136.0	39 50.4	136.8	39 03.4	137.6	38 15.9	138.4	10
2 00	42 55.6	137.7	42 07.8	138.6	41 19.7	139.4	40 31.4	140.1	39 42.5	140.9	2 00
1 50	44 23.2	140.5	43 34.0	141.3	42 44.4	142.1	41 54.5	142.8	41 04.4	143.5	1 50
40	45 45.6	143.4	44 54.9	144.1	44 03.9	144.9	43 12.8	145.6	42 21.2	146.3	40
30	47 02.4	146.4	46 10.4	147.1	45 18.0	147.9	44 25.4	148.5	43 32.6	149.2	30
20	48 13.3	149.6	47 19.7	150.3	46 26.1	151.0	45 32.2	151.6	44 38.1	152.2	20
10	49 17.5	153.0	48 22.7	153.6	47 27.6	154.2	46 32.4	154.8	45 37.0	155.4	10
1 00	50 14.5	156.5	49 18.4	157.1	48 22.3	157.6	47 25.8	158.1	46 29.4	158.6	1 00
0 50	51 03.8	160.2	50 06.7	160.7	49 09.3	161.1	48 11.9	161.6	47 14.4	162.0	0 50
40	51 44.9	164.0	50 46.8	164.4	49 48.6	164.7	48 50.4	165.1	47 52.0	165.5	40
30	52 17.6	167.9	51 18.6	168.2	50 19.5	168.5	49 20.5	168.8	48 21.4	169.0	30
20	52 41.0	171.9	51 41.5	172.1	50 41.9	172.3	49 42.4	172.5	48 42.8	172.6	20
10	52 55.3	175.9	51 55.4	176.0	50 55.5	176.1	49 55.6	176.2	48 55.7	176.3	10
0 00	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 49.8	107.9	1 21.1	108.8	0 52.3	109.6	0 23.6	110.5			5 20
10	3 56.7	109.1	3 27.8	109.9	2 57.8	110.8	2 28.2	111.7	1 58.7	112.5	10
5 00	6 02.4	110.3	5 32.4	111.1	5 02.2	112.0	4 32.0	112.9	4 01.7	113.7	5 00
4 50	8 07.4	111.5	7 36.6	112.3	7 05.6	113.2	6 34.6	114.1	6 03.5	114.9	4 50
40	10 11.1	112.8	9 39.6	113.6	9 07.9	114.5	8 36.0	115.3	8 04.1	116.2	40
30	12 13.9	114.1	11 41.5	114.9	11 08.9	115.8	10 36.1	116.6	10 03.2	117.4	30
20	14 15.2	115.4	13 42.0	116.3	13 08.5	117.1	12 34.9	118.0	12 01.2	118.8	20
10	16 15.1	116.8	15 41.1	117.7	15 06.7	118.5	14 32.1	119.4	13 57.4	120.2	10
4 00	18 13.6	118.3	17 38.6	119.1	17 03.4	119.9	16 27.8	120.8	15 52.1	121.6	4 00
3 50	20 10.6	119.8	19 34.6	120.6	18 58.2	121.4	18 21.7	122.3	17 45.0	123.1	3 50
40	22 05.6	121.4	21 28.6	122.2	20 51.3	123.0	20 13.7	123.9	19 35.9	124.7	40
30	23 58.9	123.0	23 20.7	123.8	22 42.1	124.7	22 03.5	125.5	21 24.7	126.3	30
20	25 49.8	124.7	25 10.6	125.5	24 31.0	126.4	23 51.3	127.2	23 11.2	128.0	20
10	27 38.5	126.5	26 58.1	127.3	26 17.4	128.2	25 36.4	129.0	24 55.2	129.8	10
3 00	29 24.6	128.4	28 43.0	129.2	28 01.1	130.0	27 19.0	130.8	26 36.6	131.6	3 00
2 50	31 07.9	130.4	30 25.2	131.2	29 42.1	132.0	28 58.7	132.8	28 15.0	133.5	2 50
40	32 48.3	132.4	32 04.2	133.2	31 19.9	134.0	30 35.2	134.8	29 50.3	135.5	40
30	34 25.4	134.5	33 40.1	135.3	32 54.4	136.0	32 08.4	136.8	31 22.2	137.6	30
20	35 58.8	136.8	35 12.1	137.6	34 25.1	138.3	33 37.9	139.1	32 50.5	139.8	20
10	37 28.2	139.2	36 40.2	139.9	35 52.0	140.6	35 03.5	141.4	34 14.7	142.1	10
2 00	38 53.4	141.7	38 04.1	142.4	37 14.5	143.1	36 24.7	143.8	35 34.6	144.5	2 00
1 50	40 14.0	144.3	39 23.4	145.0	38 32.4	145.6	37 41.1	146.3	36 49.9	147.0	1 50
40	41 29.4	147.0	40 37.4	147.6	39 45.3	148.3	38 52.9	148.9	38 00.4	149.5	40
30	42 39.6	149.9	41 46.2	150.5	40 52.8	151.1	39 59.1	151.6	39 05.3	152.2	30
20	43 43.6	152.8	42 49.2	153.4	41 54.6	153.9	40 59.7	154.5	40 04.8	155.0	20
10	44 41.7	155.9	43 46.0	156.4	42 50.1	156.9	41 54.2	157.4	40 58.2	157.9	10
1 00	45 32.7	159.1	44 36.0	159.6	43 39.2	160.0	42 42.4	160.4	41 45.4	160.9	1 00
0 50	46 16.8	162.4	45 19.2	162.8	44 21.5	163.2	43 23.7	163.6	42 25.8	164.0	0 50
40	46 53.5	165.8	45 55.0	166.1	44 56.5	166.4	43 58.0	166.7	42 59.4	167.0	40
30	47 22.4	169.3	46 23.2	169.5	45 24.1	169.8	44 24.9	170.0	43 25.7	170.2	30
20	47 43.2	172.8	46 43.5	173.0	45 44.0	173.2	44 44.4	173.3	43 44.8	173.4	20
10	47 55.8	176.4	46 55.9	176.5	45 56.0	176.6	44 56.1	176.7	43 56.2	176.7	10
0 00	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 29.2	113.4	0 59.7	114.3	0 30.1	115.1	0 00.3	116.0			5 10
5 00	3 31.3	114.6	3 00.9	115.5	2 30.5	116.3	2 00.0	117.2	1 29.4	118.0	5 00
4 50	5 32.2	115.8	5 01.0	116.7	4 29.6	117.5	3 58.2	118.4	3 26.8	119.2	4 50
40	7 32.0	117.0	6 59.8	117.9	6 27.5	118.7	5 55.1	119.6	5 22.7	120.4	40
30	9 30.3	118.3	8 57.2	119.2	8 24.0	120.0	7 50.6	120.9	7 17.2	121.7	30
20	11 27.2	119.7	10 53.2	120.5	10 19.0	121.3	9 44.6	122.2	9 10.1	123.0	20
10	13 22.5	121.1	12 47.5	121.9	12 52.2	122.7	11 36.7	123.6	11 01.3	124.4	10
4 00	15 16.1	122.5	14 40.1	123.3	14 03.8	124.1	13 27.3	125.0	12 50.7	125.8	4 00
3 50	17 07.9	124.0	16 30.8	124.8	15 53.5	125.6	15 15.8	126.4	14 38.2	127.2	3 50
40	18 57.8	125.5	18 19.5	126.3	17 41.1	127.1	17 02.5	127.9	16 23.6	128.7	40
30	20 45.5	127.1	20 06.2	127.9	19 26.5	128.7	18 46.7	129.5	18 06.7	130.3	30
20	22 30.8	128.8	21 50.4	129.6	21 09.5	130.4	20 28.5	131.2	19 47.3	131.9	20
10	24 13.8	130.5	23 32.1	131.3	22 50.0	132.1	22 07.7	132.9	21 25.4	133.6	10
3 00	25 53.9	132.4	25 11.0	133.2	24 27.8	133.9	23 44.3	134.7	23 00.6	135.4	3 00
2 50	27 31.1	134.3	26 46.9	135.1	26 02.5	135.8	25 17.7	136.6	24 33.0	137.3	2 50
40	29 05.1	136.3	28 19.7	137.1	27 34.0	137.8	26 48.1	138.5	26 02.0	139.2	40
30	30 35.7	138.4	29 49.1	139.1	29 02.1	139.8	28 14.9	140.5	27 27.6	141.2	30
20	32 02.7	140.5	31 14.7	141.2	30 26.5	141.9	29 38.1	142.6	28 49.4	143.3	20
10	33 25.7	142.8	32 36.3	143.5	31 46.9	144.1	30 57.2	144.8	30 07.4	145.5	10
2 00	34 44.3	145.1	33 53.8	145.8	33 03.1	146.4	32 12.1	147.1	31 21.0	147.7	2 00
1 50	35 58.3	147.6	35 06.7	148.2	34 14.7	148.8	33 22.4	149.4	32 30.2	150.0	1 50
40	37 07.4	150.1	36 14.5	150.7	35 21.4	151.3	34 28.1	151.8	33 34.6	152.4	40
30	38 11.3	152.8	37 17.2	153.3	36 22.9	153.9	35 28.6	154.4	34 34.0	154.9	30
20	39 09.6	155.5	38 14.5	156.0	37 19.1	156.5	36 23.7	157.0	35 28.0	157.4	20
10	40 02.0	158.4	39 05.8	158.8	38 09.4	159.2	37 12.9	159.7	36 16.4	160.1	10
1 00	40 48.2	161.3	39 51.1	161.7	38 53.8	162.0	37 56.4	162.4	36 58.9	162.8	1 00
0 50	41 27.9	164.3	40 30.0	164.6	39 31.7	164.9	38 33.6	165.2	37 35.5	165.6	0 50
40	42 00.7	167.3	41 02.0	167.6	40 03.3	167.9	39 04.4	168.1	38 05.6	168.4	40
30	42 26.5	170.5	41 27.2	170.7	40 28.0	170.9	39 28.6	171.1	38 29.3	171.3	30
20	42 45.1	173.6	41 45.4	173.8	40 45.8	173.9	39 46.0	174.0	38 46.3	174.2	20
10	42 56.3	176.8	41 56.4	176.9	40 56.4	176.9	39 56.5	177.0	38 56.6	177.1	10
0 00	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 28.2	89.1	0 56.3	88.2	1 24.5	87.4	1 52.6	86.5	6 00
5 50	2 12.4	91.1	2 40.7	90.3	3 08.8	89.4	3 36.9	88.5	4 04.9	87.6	5 50
40	4 24.8	92.3	4 53.1	91.5	5 21.1	90.6	5 49.3	89.7	6 17.2	88.8	40
30	6 37.0	93.5	7 05.4	92.6	7 33.6	91.8	8 01.7	90.9	8 29.6	90.0	30
20	8 49.2	94.7	9 17.7	93.8	9 45.9	92.9	10 14.1	92.0	10 42.1	91.2	20
10	11 01.0	96.0	11 29.7	95.0	11 58.1	94.1	12 26.4	93.2	12 54.5	92.4	10
5 00	13 12.6	97.2	13 41.5	96.3	14 10.1	95.3	14 38.6	94.4	15 06.8	93.6	5 00
4 50	15 23.8	98.4	15 52.9	97.5	16 21.8	96.6	16 50.5	95.7	17 18.8	94.8	4 50
40	17 34.6	99.7	18 04.1	98.8	18 33.2	97.9	19 02.1	96.9	19 30.7	96.0	40
30	19 44.9	101.0	20 14.7	100.1	20 44.2	99.2	21 13.4	98.2	21 42.2	97.3	30
20	21 54.6	102.3	22 24.9	101.4	22 54.7	100.5	23 24.2	99.5	23 53.4	98.6	20
10	24 03.7	103.7	24 34.3	102.8	25 04.7	101.8	25 34.6	100.9	26 04.2	99.9	10
4 00	26 11.9	105.2	26 43.4	104.2	27 13.9	103.2	27 44.3	102.3	28 14.3	101.3	4 00
3 50	28 19.2	106.7	28 51.1	105.7	29 22.5	104.7	29 53.4	103.7	30 23.8	102.7	3 50
40	30 25.6	108.2	30 58.1	107.2	31 30.0	106.2	32 01.6	105.2	32 32.7	104.2	40
30	32 30.8	109.8	33 04.0	108.8	33 36.8	107.8	34 08.9	106.8	34 40.6	105.8	30
20	34 34.8	111.5	35 08.8	110.5	35 42.1	109.5	36 15.1	108.4	36 47.5	107.4	20
10	36 37.2	113.3	37 12.0	112.3	37 46.4	111.2	38 20.1	110.2	38 53.2	109.1	10
3 00	38 38.0	115.1	39 13.9	114.1	39 48.9	113.1	40 23.7	112.0	40 57.8	110.9	3 00
2 50	40 36.9	117.1	41 13.8	116.1	41 50.1	115.0	42 25.6	113.9	43 00.7	112.8	2 50
40	42 33.6	119.2	43 11.7	118.2	43 48.9	117.1	44 25.7	116.0	45 01.8	114.9	40
30	44 27.9	121.5	45 07.1	120.4	45 45.7	119.3	46 23.6	118.2	47 00.8	117.1	30
20	46 19.5	123.8	47 00.1	122.8	47 39.7	121.7	48 19.0	120.5	48 57.6	119.4	20
10	48 07.8	126.4	48 49.8	125.3	49 31.1	124.2	50 11.6	123.1	50 51.6	121.9	10
2 00	49 52.6	129.1	50 36.1	128.0	51 18.7	126.9	52 00.9	125.8	52 42.4	124.6	2 00
1 50	51 33.2	132.1	52 18.2	131.0	53 02.6	129.8	53 46.4	128.7	54 29.4	127.5	1 50
40	53 09.1	135.2	53 55.9	134.1	54 41.8	133.1	55 27.4	131.9	56 12.2	130.7	40
30	54 39.5	138.6	55 28.0	137.5	56 15.9	136.5	57 03.2	135.4	57 50.0	134.2	30
20	56 04.1	142.2	56 54.4	141.2	57 43.9	140.2	58 33.3	139.1	59 22.0	138.0	20
10	57 21.4	146.2	58 13.6	145.2	59 05.2	144.2	59 56.4	143.2	60 47.0	142.1	10
1 00	58 31.5	150.3	59 25.4	149.4	60 18.6	148.5	61 11.7	147.6	62 04.3	146.6	1 00
0 50	59 32.6	154.7	60 28.1	154.0	61 23.2	153.2	62 18.0	152.3	63 12.8	151.4	0 50
40	60 24.3	159.4	61 21.4	158.8	62 17.8	158.1	63 14.5	157.4	64 10.8	156.6	40
30	61 05.5	164.3	62 03.6	163.8	63 01.9	163.3	63 59.8	162.7	64 57.5	162.1	30
20	61 35.5	169.5	62 34.9	169.1	63 33.8	168.7	64 32.9	168.3	65 31.9	167.9	20
10	61 53.9	174.7	62 53.7	174.5	63 53.4	174.3	64 53.2	174.1	65 53.1	173.9	10
0 00	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10	0 08.8	84.4	0 37.1	83.5	1 05.7	82.7	1 33.6	81.8	2 01.8	80.9	6 10
6 00	2 20.6	85.6	2 48.7	84.7	3 16.7	83.8	3 44.8	82.9	4 12.7	82.0	6 00
5 50	4 32.9	86.8	5 00.8	85.9	5 28.7	85.0	5 56.4	84.1	6 24.2	83.2	5 50
40	6 45.1	87.9	7 12.9	87.0	7 40.6	86.1	8 08.2	85.2	8 35.7	84.3	40
30	8 57.6	89.1	9 25.3	88.2	9 52.9	87.3	10 20.4	86.4	10 47.7	85.5	30
20	11 09.9	90.3	11 37.6	89.4	12 05.2	88.4	12 32.6	87.5	12 59.7	86.6	20
10	13 22.5	91.4	13 50.2	90.5	14 17.6	89.6	14 45.0	88.7	15 12.1	87.7	10
5 00	15 34.8	92.6	16 02.5	91.7	16 30.0	90.8	16 57.4	89.8	17 24.4	88.9	5 00
4 50	17 47.0	93.8	18 14.9	92.9	18 42.5	92.0	19 09.9	91.0	19 36.8	90.1	4 50
40	19 59.0	95.0	20 27.0	94.1	20 54.7	93.2	21 22.2	92.2	21 49.3	91.3	40
30	22 10.8	96.3	22 39.0	95.3	23 07.0	94.4	23 34.5	93.4	24 01.7	92.5	30
20	24 22.2	97.6	24 50.7	96.6	25 18.8	95.7	25 46.6	94.7	26 13.9	93.7	20
10	26 33.3	98.9	27 02.1	97.9	27 30.5	97.0	27 58.5	96.0	28 25.9	95.0	10
4 00	28 43.9	100.3	29 13.0	99.3	29 41.7	98.3	30 10.1	97.3	30 37.8	96.3	4 00
3 50	30 53.9	101.7	31 23.6	100.7	31 52.6	99.7	32 21.2	98.6	32 49.2	97.6	3 50
40	33 03.2	103.2	33 33.3	102.2	34 02.8	101.1	34 31.9	100.1	35 00.3	99.0	40
30	35 11.8	104.7	35 42.4	103.7	36 12.5	102.6	36 42.0	101.5	37 10.9	100.4	30
20	37 19.3	106.3	37 50.6	105.3	38 21.2	104.2	38 51.4	103.1	39 20.7	101.9	20
10	39 25.9	108.0	39 57.9	106.9	40 29.3	105.8	41 00.0	104.7	41 30.0	103.5	10
3 00	41 31.1	109.8	42 03.9	108.7	42 36.0	107.6	43 07.6	106.4	43 38.2	105.2	3 00
2 50	43 35.1	111.7	44 08.8	110.6	44 41.7	109.4	45 14.0	108.2	45 45.5	107.0	2 50
40	45 37.2	113.7	46 11.8	112.5	46 45.8	111.4	47 19.1	110.1	47 51.6	108.9	40
30	47 37.5	115.9	48 13.2	114.7	48 48.3	113.5	49 22.7	112.2	49 56.0	110.9	30
20	49 35.4	118.2	50 12.4	117.0	50 48.7	115.7	51 24.3	114.4	51 58.9	113.1	20
10	51 30.8	120.7	52 09.2	119.4	52 46.9	118.1	53 23.7	116.8	53 59.6	115.5	10
2 00	53 23.0	123.4	54 03.0	122.1	54 42.1	120.8	55 20.5	119.5	55 57.8	118.1	2 00
1 50	55 11.9	126.3	55 53.4	125.0	56 34.3	123.7	57 14.2	122.3	57 53.1	120.9	1 50
40	56 56.3	129.5	57 39.7	128.2	58 22.2	126.9	59 04.2	125.5	59 44.9	124.1	40
30	58 35.9	133.0	59 21.2	131.7	60 05.9	130.4	60 49.6	129.0	61 32.4	127.5	30
20	60 09.8	136.8	60 57.2	135.5	61 43.7	134.2	62 29.8	132.8	63 14.6	131.4	20
10	61 37.1	140.9	62 26.5	139.7	63 15.4	138.5	64 03.5	137.1	64 50.8	135.7	10
1 00	62 56.2	145.5	63 47.9	144.3	64 38.9	143.1	65 29.7	141.8	66 19.3	140.5	1 00
0 50	64 06.8	150.4	65 00.6	149.4	65 53.7	148.3	66 46.7	147.1	67 38.8	145.8	0 50
40	65 06.7	155.7	66 02.5	154.8	66 57.8	153.9	67 53.0	152.8	68 47.4	151.7	40
30	65 55.2	161.4	66 52.8	160.7	67 50.0	159.9	68 47.0	159.1	69 43.7	158.2	30
20	66 30.7	167.4	67 29.6	166.9	68 28.3	166.4	69 27.1	165.8	70 25.5	165.1	20
10	66 52.7	173.7	67 52.4	173.4	68 52.1	173.1	69 51.7	172.8	70 51.3	172.5	10
0 00	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——19

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 06.1	74.1	6 30
20	0 19.7	78.8	0 48.3	78.0	1 16.9	77.0	1 45.3	76.2	2 13.8	75.3	20
10	2 30.0	80.0	2 58.1	79.1	3 26.2	78.2	3 54.3	77.3	4 22.1	76.5	10
6 00	4 40.6	81.2	5 08.3	80.3	5 36.1	79.4	6 03.7	78.5	6 31.3	77.6	6 00
5 50	6 51.7	82.3	7 19.1	81.4	7 46.6	80.5	8 13.8	79.6	8 40.9	78.7	5 50
40	9 03.1	83.4	9 30.1	82.5	9 57.3	81.6	10 24.3	80.7	10 51.0	79.8	40
30	11 14.7	84.6	11 41.7	83.6	12 08.6	82.7	12 35.1	81.8	13 01.7	80.9	30
20	13 26.8	85.7	13 53.4	84.8	14 20.0	83.9	14 46.4	82.9	15 12.5	82.0	20
10	15 38.9	86.8	16 05.5	85.9	16 31.9	85.0	16 58.1	84.0	17 23.9	83.1	10
5 00	17 51.3	88.0	18 17.6	87.0	18 43.9	86.1	19 09.9	85.1	19 35.5	84.2	5 00
4 50	20 03.6	89.1	20 30.0	88.1	20 56.2	87.2	21 21.9	86.2	21 47.4	85.3	4 50
40	22 16.1	90.3	22 42.3	89.3	23 08.4	88.3	23 34.1	87.4	23 59.5	86.4	40
30	24 28.5	91.5	24 54.9	90.5	25 20.9	89.5	25 46.5	88.5	26 11.8	87.5	30
20	26 40.8	92.7	27 07.2	91.7	27 33.3	90.7	27 58.9	89.6	28 24.1	88.6	20
10	28 53.1	94.0	29 19.7	92.9	29 45.8	91.9	30 11.4	90.8	30 36.6	89.8	10
4 00	31 05.1	95.2	31 31.7	94.2	31 58.0	93.1	32 23.8	92.0	32 48.9	91.0	4 00
3 50	33 16.8	96.5	33 43.8	95.5	34 10.2	94.4	34 36.1	93.3	35 01.4	92.2	3 50
40	35 28.3	97.9	35 55.3	96.8	36 22.1	95.7	36 48.2	94.6	37 13.6	93.4	40
30	37 39.2	99.3	38 06.8	98.2	38 33.8	97.0	39 00.1	95.9	39 25.8	94.7	30
20	39 49.6	100.8	40 17.5	99.6	40 44.9	98.5	41 11.6	97.3	41 37.6	96.1	20
10	41 59.3	102.4	42 27.9	101.2	42 55.8	100.0	43 22.7	98.8	43 49.1	97.5	10
3 00	44 08.3	104.0	44 37.3	102.8	45 05.8	101.5	45 33.4	100.3	46 00.1	99.0	3 00
2 50	46 16.3	105.7	46 46.1	104.5	47 15.3	103.2	47 43.4	101.9	48 10.7	100.6	2 50
40	48 23.2	107.6	48 53.7	106.3	49 23.6	105.0	49 52.6	103.6	50 20.5	102.2	40
30	50 28.6	109.6	51 00.3	108.3	51 31.0	106.9	52 00.8	105.5	52 29.6	104.0	30
20	52 32.6	111.8	53 05.2	110.4	53 37.0	109.0	54 07.7	107.5	54 37.4	106.0	20
10	54 34.5	114.1	55 08.4	112.7	55 41.4	111.2	56 13.2	109.7	56 43.8	108.1	10
2 00	56 34.3	116.6	57 09.4	115.2	57 43.8	113.6	58 17.1	112.1	58 49.1	110.5	2 00
1 50	58 31.2	119.4	59 08.2	117.9	59 44.0	116.3	60 18.7	114.7	60 52.1	113.1	1 50
40	60 24.8	122.6	61 03.3	121.0	61 40.9	119.4	62 17.5	117.7	62 52.7	115.9	40
30	62 14.2	126.0	62 54.8	124.4	63 34.5	122.7	64 13.0	121.0	64 50.2	119.2	30
20	63 58.7	129.9	64 41.5	128.3	65 23.4	126.6	66 04.3	124.8	66 43.7	122.9	20
10	65 37.1	134.2	66 22.5	132.6	67 06.8	130.9	67 50.0	129.0	68 32.2	127.1	10
1 00	67 08.3	139.0	67 56.1	137.4	68 43.2	135.8	69 29.5	134.0	70 14.2	132.0	1 00
0 50	68 30.2	144.4	69 21.0	143.0	70 11.2	141.3	71 00.2	139.6	71 48.2	137.7	0 50
40	69 41.8	150.5	70 35.1	149.2	71 28.0	147.7	72 20.2	146.1	73 11.6	144.3	40
30	70 40.2	157.2	71 36.0	156.1	72 31.8	154.8	73 26.8	153.5	74 21.5	151.9	30
20	71 24.0	164.5	72 21.8	163.6	73 19.9	162.7	74 17.3	161.7	75 14.9	160.6	20
10	71 50.9	172.1	72 50.4	171.7	73 49.8	171.3	74 49.2	170.7	75 48.5	170.1	10
0 00	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 27.1	68.6	6 40
30	0 35.1	73.3	1 04.1	72.4	1 33.1	71.5	2 01.9	70.7	2 30.9	69.8	30
20	2 42.3	74.4	3 10.7	73.6	3 39.1	72.7	4 07.3	71.8	4 35.6	70.9	20
10	4 50.1	75.6	5 18.0	74.7	5 45.9	73.8	6 13.6	72.9	6 41.2	72.0	10
6 00	6 58.8	76.7	7 26.1	75.8	7 53.3	74.9	8 20.5	74.0	8 47.5	73.1	6 00
5 50	9 07.9	77.8	9 34.8	76.9	10 01.6	76.0	10 28.1	75.1	10 54.6	74.2	5 50
40	11 17.6	78.9	11 44.0	78.0	12 10.3	77.1	12 36.5	76.1	13 02.3	75.2	40
30	13 27.8	80.0	13 54.0	79.1	14 19.6	78.2	14 45.2	77.2	15 10.6	76.2	30
20	15 38.5	81.1	16 04.1	80.1	16 29.5	79.2	16 54.7	78.2	17 19.6	77.3	20
10	17 49.4	82.1	18 14.8	81.1	18 39.9	80.2	19 04.6	79.3	19 29.0	78.3	10
5 00	20 00.8	83.2	20 25.8	82.2	20 50.5	81.3	21 14.9	80.3	21 38.9	79.3	5 00
4 50	22 12.5	84.3	22 37.2	83.3	23 01.7	82.3	23 25.7	81.3	23 49.3	80 3	4 50
40	24 24.4	85.4	24 48.9	84.4	25 13.0	83.4	25 36.8	82.3	26 00.0	81.3	40
30	26 36.5	86.5	27 00.9	85.4	27 24.7	84.4	27 48.1	83.3	28 11.1	82.3	30
20	28 48.8	87.6	29 12.9	86.5	29 36.6	85.5	29 59.9	84.4	30 22.6	83.3	20
10	31 01.1	88.7	31 25.2	87.6	31 48.8	86.6	32 11.7	85.5	32 34.2	84.4	10
4 00	33 13.5	89.9	33 37.5	88.8	34 01.0	87.7	34 24.0	86.6	34 46.1	85.4	4 00
3 50	35 25.9	91.1	35 50.1	89.9	36 13.4	88.8	36 36.1	87.6	36 58.2	86.4	3 50
40	37 38.4	92.3	38 02.4	91.1	38 25.8	90.0	38 48.6	88.8	39 10.5	87.6	40
30	39 50.7	93.5	40 14.9	92.3	40 38.2	91.2	41 01.0	89.9	41 22.8	88.7	30
20	42 02.8	94.9	42 27.0	93.6	42 50.6	92.4	43 13.5	91.1	43 35.3	89.8	20
10	44 14.5	96.3	44 39.2	95.0	45 02.9	93.7	45 25.8	92.3	45 47.7	91.0	10
3 00	46 26.0	97.7	46 50.9	96.4	47 14.9	95.0	47 38.4	93.6	48 00.2	92.3	3 00
2 50	48 37.0	99.2	49 02.4	97.8	49 26.8	96.4	49 50.0	95.0	50 12.3	93.6	2 50
40	50 47.4	100.8	51 13.3	99.4	51 38.1	97.9	52 02.0	96.5	52 24.5	95.0	40
30	52 57.1	102.6	53 23.7	101.1	53 49.0	99.6	54 13.1	98.0	54 36.2	96.4	30
20	55 05.9	104.5	55 33.1	102.9	55 59.2	101.3	56 24.3	99.7	56 47.7	98.0	20
10	57 13.5	106.5	57 41.8	104.9	58 08.6	103.2	58 34.2	101.5	58 58.5	99.7	10
2 00	59 19.7	108.8	59 49.0	107.1	60 17.0	105.3	60 43.8	103.5	61 08.8	101.6	2 00
1 50	61 24.1	111.3	61 54.8	109.5	62 24.1	107.6	62 51.8	105.7	63 17.9	103.7	1 50
40	63 26.4	114.1	63 58.6	112.2	64 29.3	110.2	64 58.7	108.2	65 26.0	106.0	40
30	65 25.8	117.3	66 00.0	115.3	66 32.5	113.2	67 03.2	111.0	67 32.2	108.7	30
20	67 21.7	120.9	67 57.9	118.8	68 32.6	116.6	69 05.8	114.3	69 36.6	111.9	20
10	69 12.8	125.1	69 51.8	122.9	70 29.0	120.6	71 04.5	118.1	71 37.7	115.6	10
1 00	70 57.9	130.0	71 39.6	127.7	72 20.1	125.3	72 58.9	122.7	73 35.2	120.0	1 00
0 50	72 34.8	135.7	73 20.1	133.4	74 04.2	131.0	74 46.5	128.3	75 26.5	125.5	0 50
40	74 02.0	142.4	74 51.1	140.2	75 38.9	137.9	76 25.4	135.2	77 09.8	132.4	40
30	75 15.2	150.3	76 08.6	148.3	77 00.5	146.2	77 51.0	143.7	78 40.7	141.0	30
20	76 11.8	159.4	77 08.3	157.8	78 04.4	156.2	79 00.0	154.3	79 54.3	152.0	20
10	76 47.7	169.4	77 46.8	168.6	78 45.7	167.6	79 44.4	166.5	80 42.8	165.2	10
0 00	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 25.9	64.0	0 56.3	63.1	6 50
40	0 56.7	67.8	1 26.3	66.9	1 55.9	66.0	2 25.5	65.1	2 55.0	64.3	40
30	2 59.8	68.9	3 28.7	68.0	3 57.4	67.1	4 26.2	66.3	4 54.9	65.4	30
20	5 03.8	70.0	5 31.9	69.1	6 00.0	68.3	6 22.9	67.4	6 55.8	66.5	20
10	7 08.7	71.1	7 36.2	70.2	8 03.5	69.3	8 30.7	68.4	8 57.7	67.5	10
6 00	9 14.4	72.2	9 41.2	71.3	10 07.7	70.4	10 34.2	69.5	11 00.5	68.5	6 00
5 50	11 20.7	73.2	11 46.9	72.3	12 12.9	71.4	12 38.7	70.5	13 04.2	69.5	5 50
40	13 28.0	74.3	13 53.5	73.4	14 18.7	72.4	14 43.8	71.5	15 08.6	70.5	40
30	15 35.8	75.3	16 00.7	74.4	16 25.3	73.4	16 49.7	72.5	17 13.9	71.5	30
20	17 44.2	76.3	18 08.5	75.4	18 32.6	74.4	18 56.3	73.4	19 19.8	72.4	20
10	19 53.2	77.3	20 17.0	76.4	20 40.5	75.4	21 03.7	74.4	21 26.4	73.4	10
5 00	22 02.6	78.3	22 25.9	77.3	22 48.9	76.3	23 11.4	75.3	23 33.6	74.3	5 00
4 50	24 12.5	79.3	24 35.4	78.3	24 57.8	77.3	25 19.8	76.2	25 41.5	75.2	4 50
40	26 22.9	80.3	26 45.4	79.3	27 07.2	78.2	27 28.6	77.2	27 49.6	76.1	40
30	28 33.6	81.3	28 55.7	80.3	29 17.2	79.2	29 38.2	78.1	29 58.6	77.0	30
20	30 44.7	82.3	31 06.3	81.2	31 27.3	80.1	31 47.9	79.0	32 07.7	77.9	20
10	32 56.1	83.3	33 17.3	82.2	33 38.0	81.0	33 58.0	79.9	34 17.4	78.8	10
4 00	35 07.8	84.3	35 28.7	83.1	35 48.9	82.0	36 08.6	80.8	36 27.6	79.7	4 00
3 50	37 19.6	85.3	37 40.3	84.1	38 00.2	83.0	38 19.6	81.7	38 38.1	80.5	3 50
40	39 31.7	86.4	39 52.2	85.1	40 11.8	83.9	40 30.7	82.6	40 48.8	81.4	40
30	41 44.0	87.4	42 04.3	86.1	42 23.6	84.9	42 42.2	83.6	42 59.9	82.3	30
20	43 56.4	88.5	44 16.5	87.2	44 35.7	85.9	44 53.9	84.6	45 11.3	83.2	20
10	46 08.7	89.7	46 28.8	88.3	46 47.9	86.9	47 06.0	85.5	47 22.9	84.2	10
3 00	48 21.2	90.9	48 41.2	89.4	49 00.2	88.0	49 18.0	86.5	49 34.7	85.1	3 00
2 50	50 33.5	92.1	50 53.6	90.6	51 12.6	89.1	51 30.2	87.6	51 46.7	86.1	2 50
40	52 45.8	93.4	53 06.1	91.8	53 24.9	90.3	53 42.7	88.7	53 59.0	87.1	40
30	54 57.9	94.8	55 18.4	93.1	55 37.4	91.5	55 55.2	89.8	56 11.4	88.1	30
20	57 09.8	96.3	57 30.6	94.5	57 49.7	92.8	58 07.6	91.0	58 23.7	89.2	20
10	59 21.1	97.9	59 42.2	96.1	60 01.9	94.2	60 19.9	92.3	60 36.2	90.3	10
2 00	61 32.1	99.7	61 53.9	97.7	62 13.8	95.7	62 32.2	93.6	62 48.6	91.6	2 00
1 50	63 42.1	101.6	64 04.7	99.5	64 25.5	97.4	64 44.4	95.2	65 00.9	92.9	1 50
40	65 51.5	103.8	66 15.1	101.6	66 36.5	99.3	66 55.9	96.9	67 13.0	94.4	40
30	67 59.2	106.4	68 24.2	103.9	68 46.7	101.4	69 07.2	98.8	69 25.0	96.1	30
20	70 05.5	109.3	70 31.9	106.6	70 56.1	103.9	71 17.6	101.0	71 36.4	98.0	20
10	72 09.0	112.8	72 37.5	109.9	73 04.0	106.8	73 27.0	103.6	73 47.2	100.3	10
1 00	74 09.4	117.0	74 40.9	113.9	75 09.3	110.5	75 34.6	106.9	75 56.8	103.1	1 00
0 50	76 04.0	122.2	76 39.2	118.9	77 11.5	115.2	77 40.0	111.1	78 05.0	106.8	0 50
40	77 52.0	128.9	78 32.0	125.4	79 08.2	121.3	79 41.1	116.8	80 09.8	111.7	40
30	79 28.2	137.8	80 13.5	134.1	80 56.5	129.8	81 35.5	124.8	82 10.0	119.0	30
20	80 47.4	149.2	81 39.2	145.9	82 28.8	141.9	83 16.0	136.9	83 59.1	130.6	20
10	81 40.9	163.6	82 38.4	161.5	83 35.2	158.8	84 30.9	155.2	85 24.7	150.1	10
0 00	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	86 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 12.4	91.1	1 44.3	92.0	1 16.0	92.9	0 47.8	93.8	0 19.5	94.7	5 50
40	4 24.8	92.3	3 56.6	93.2	3 28.2	94.1	2 59.8	95.0	2 31.3	95.9	40
30	6 37.0	93.5	6 08.7	94.4	5 40.1	95.3	5 11.6	96.2	4 43.0	97.1	30
20	8 49.2	94.7	8 20.7	95.6	7 51.9	96.5	7 23.1	97.4	6 54.2	98.3	20
10	11 01.0	96.0	10 32.3	96.8	10 03.3	97.7	9 34.3	98.6	9 05.1	99.5	10
5 00	13 12.6	97.2	12 43.6	98.1	12 14.4	99.0	12 45.0	99.9	12 15.5	100.7	5 00
4 50	15 23.8	98.4	14 54.5	99.3	14 24.9	100.2	13 55.2	101.1	13 25.2	102.0	4 50
40	17 34.6	99.7	17 05.0	100.6	16 35.0	101.5	16 04.9	102.4	15 34.5	103.3	40
30	19 44.9	101.0	19 14.8	101.9	18 44.4	102.8	18 13.9	103.7	17 43.0	104.6	30
20	21 54.6	102.3	21 24.1	103.3	20 53.3	104.2	20 22.2	105.1	19 50.7	106.0	20
10	24 03.7	103.7	23 32.6	104.7	23 01.2	105.6	22 29.6	106.5	21 57.6	107.4	10
4 00	26 11.9	105.2	25 40.3	106.1	25 08.4	107.1	24 36.1	108.0	24 03.4	108.9	4 00
3 50	28 19.2	106.7	27 47.1	107.6	27 14.5	108.6	26 41.6	109.5	26 08.2	110.4	3 50
40	30 25.6	108.2	29 52.8	109.1	29 19.4	110.1	28 45.7	111.1	28 11.6	112.0	40
30	32 30.8	109.8	31 57.2	110.8	31 23.2	111.8	30 48.6	112.7	30 13.7	113.7	30
20	34 34.8	111.5	34 00.4	112.5	33 25.4	113.5	32 50.0	114.4	32 14.2	115.4	20
10	36 37.2	113.3	36 01.8	114.3	35 26.0	115.3	34 49.7	116.2	34 12.9	117.2	10
3 00	38 38.0	115.1	38 01.7	116.2	37 24.8	117.2	36 47.5	118.1	36 09.7	119.1	3 00
2 50	40 36.9	117.1	39 59.6	118.2	39 21.7	119.2	38 43.2	120.1	38 04.2	121.1	2 50
40	42 33.6	119.2	41 55.2	120.3	41 16.0	121.3	40 36.4	122.2	39 56.4	123.2	40
30	44 27.9	121.5	43 48.2	122.5	43 07.8	123.5	42 27.1	124.5	41 45.7	125.5	30
20	46 19.5	123.8	45 38.5	124.9	44 56.7	125.9	44 14.6	126.9	43 31.9	127.9	20
10	48 07.8	126.4	47 25.3	127.5	46 42.4	128.5	45 58.8	129.5	45 14.6	130.4	10
2 00	49 52.6	129.1	49 08.7	130.2	48 24.0	131.2	47 38.9	132.2	46 53.4	133.1	2 00
1 50	51 33.2	132.1	50 47.6	133.1	50 01.5	134.1	49 14.9	135.1	48 27.8	136.0	1 50
40	53 09.1	135.2	52 22.0	136.2	51 34.0	137.2	50 45.9	138.2	49 57.2	139.1	40
30	54 39.5	138.6	53 50.6	139.6	53 01.1	140.5	52 11.4	141.4	51 21.1	142.3	30
20	56 04.1	142.2	55 13.5	143.2	54 22.2	144.1	53 30.8	145.0	52 39.0	145.8	20
10	57 21.4	146.2	56 29.2	147.0	55 36.4	147.9	54 43.4	148.7	53 49.9	149.5	10
1 00	58 31.5	150.3	57 37.5	151.0	56 43.0	151.9	55 48.2	152.6	54 53.3	153.3	1 00
0 50	59 32.6	154.7	58 37.0	155.4	57 41.0	156.1	56 44.9	156.7	55 48.6	157.3	0 50
40	60 24.3	159.4	59 27.1	160.0	58 29.8	160.6	57 32.5	161.2	56 34.9	161.7	40
30	61 05.5	164.3	60 07.1	164.8	59 08.8	165.3	58 10.2	165.7	57 11.6	166.1	30
20	61 35.5	169.5	60 36.5	169.8	59 37.1	170.1	58 37.7	170.4	57 38.3	170.6	20
10	61 53.9	174.7	60 54.1	174.9	59 54.2	175.0	58 54.4	175.2	57 54.6	175.3	10
0 00	62 0.0	180.0	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	2 02.9	96.8	1 34.4	97.6	1 05.8	98.5	0 37.4	99.4	0 08.8	100.3	5 40
30	4 14.3	98.0	3 45.6	98.8	3 16.7	99.7	2 47.9	100.6	2 18.9	101.5	30
20	6 25.2	99.2	5 56.1	100.0	5 26.9	100.9	4 57.8	101.8	4 28.4	102.7	20
10	8 35.9	100.4	8 06.4	101.2	7 36.8	102.1	7 07.1	103.0	6 37.3	103.9	10
5 00	10 45.8	101.6	10 15.9	102.5	9 45.8	103.4	9 15.8	104.3	8 45.5	105.1	5 00
4 50	12 55.2	102.9	12 24.9	103.8	11 54.5	104.7	11 23.8	105.6	10 53.0	106.4	4 50
40	15 03.9	104.2	14 33.1	105.1	14 02.1	106.0	13 31.0	106.9	12 59.6	107.7	40
30	17 12.0	105.5	16 40.6	106.4	16 09.1	107.3	15 37.3	108.2	15 05.2	109.1	30
20	19 19.0	106.9	18 47.1	107.8	18 15.0	108.7	17 42.6	109.6	17 09.8	110.5	20
10	21 25.3	108.3	20 52.8	109.2	20 19.9	110.1	19 46.8	111.0	19 13.4	111.9	10
4 00	23 30.5	109.8	22 57.2	110.7	22 23.6	111.6	21 49.8	112.5	21 15.6	113.4	4 00
3 50	25 34.5	111.3	25 00.6	112.3	24 26.2	113.2	23 51.5	114.1	23 16.5	114.9	3 50
40	27 37.1	112.9	27 02.3	113.9	26 27.1	114.8	25 51.7	115.7	25 15.7	116.5	40
30	29 38.4	114.6	29 02.6	115.5	28 26.6	116.4	27 50.2	117.3	27 13.4	118.2	30
20	31 37.9	116.3	31 01.3	117.2	30 24.2	118.2	29 46.9	119.1	29 09.0	120.0	20
10	33 35.8	118.2	32 58.1	119.1	32 20.1	120.0	31 41.6	120.9	31 02.8	121.8	10
3 00	35 31.4	120.1	34 52.7	121.0	34 13.5	121.9	33 34.1	122.8	32 54.1	123.7	3 00
2 50	37 25.0	122.1	36 45.1	123.0	36 04.8	123.9	35 24.1	124.8	34 43.2	125.7	2 50
40	39 15.8	124.2	38 34.7	125.1	37 53.2	126.1	37 11.4	127.0	36 29.1	127.8	40
30	41 03.9	126.5	40 21.6	127.4	39 38.8	128.3	38 55.7	129.2	38 12.1	130.0	30
20	42 48.7	128.9	42 05.0	129.8	41 21.0	130.7	40 36.6	131.6	39 51.7	132.4	20
10	44 30.2	131.4	43 45.0	132.3	42 59.6	133.2	42 13.6	134.1	41 27.5	134.9	10
2 00	46 07.3	134.1	45 20.9	135.0	44 33.9	135.9	43 46.8	136.7	42 59.1	137.5	2 00
1 50	47 40.3	136.9	46 52.2	137.8	46 04.0	138.7	45 15.2	139.5	44 26.1	140.3	1 50
40	49 08.1	139.9	48 18.7	140.8	47 28.7	141.6	46 38.7	142.4	45 48.1	143.2	40
30	50 30.5	143.1	49 39.5	144.0	48 48.2	144.8	47 56.5	145.5	47 04.6	146.3	30
20	51 46.6	146.6	50 54.2	147.4	50 01.3	148.1	49 08.4	148.8	48 15.0	149.5	20
10	52 56.2	150.2	52 02.2	150.9	51 08.0	151.6	50 13.5	152.3	49 18.8	152.9	10
1 00	53 58.0	154.0	53 02.7	154.7	52 07.0	155.3	51 11.5	155.9	50 15.5	156.4	1 00
0 50	54 52.1	158.0	53 55.5	158.6	52 58.5	159.1	52 01.7	159.6	51 04.6	160.1	0 50
40	55 37.1	162.2	54 39.4	162.6	53 41.4	163.1	52 43.6	163.5	51 45.4	163.9	40
30	56 13.1	166.5	55 14.4	166.8	54 15.6	167.2	53 16.7	167.5	52 17.8	167.8	30
20	56 38.9	170.9	55 39.5	171.2	54 40.1	171.4	53 40.7	171.6	52 41.1	171.8	20
10	56 54.8	175.4	55 54.9	175.6	54 55.0	175.7	53 55.2	175.8	52 55.3	175.9	10
0 00	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 49.9	102.3	1 20.9	103.2	0 52.1	104.1	0 22.9	105.0			5 30
20	3 59.1	103.5	3 29.6	104.4	3 00.0	105.3	2 30.6	106.2	2 01.0	107.0	20
10	6 07.5	104.7	5 37.5	105.6	5 07.5	106.5	4 37.4	107.4	4 07.2	108.2	10
5 00	8 15.2	106.0	7 44.6	106.9	7 14.0	107.7	6 43.3	108.6	6 12.5	109.5	5 00
4 50	10 22.1	107.3	9 50.9	108.2	9 19.8	109.0	8 48.4	109.9	8 16.9	110.8	4 50
40	12 28.1	108.6	11 56.2	109.5	11 24.4	110.3	10 52.4	111.2	10 20.2	112.1	40
30	14 33.2	110.0	14 00.7	110.8	13 28.1	111.7	12 55.3	112.5	12 22.4	113.4	30
20	16 37.0	111.4	16 03.8	112.2	15 30.5	113.1	14 57.0	113.9	14 23.3	114.8	20
10	18 39.7	112.8	18 05.9	113.6	17 31.8	114.5	16 57.4	115.3	16 22.8	116.2	10
4 00	20 41.2	114.3	20 06.4	115.1	19 31.5	116.0	18 56.3	116.8	18 20.8	117.7	4 00
3 50	22 41.2	115.8	22 05.5	116.7	21 29.8	117.6	20 53.7	118.4	20 17.3	119.3	3 50
40	24 39.6	117.4	24 03.0	118.3	23 26.3	119.2	22 49.2	120.0	22 11.9	120.9	40
30	26 36.3	119.1	25 58.8	120.0	25 21.1	120.8	24 42.9	121.6	24 04.7	122.5	30
20	28 31.0	120.8	27 52.4	121.7	27 13.6	122.6	26 34.6	123.4	25 55.2	124.3	20
10	30 23.6	122.7	29 44.1	123.5	29 04.2	124.4	28 23.9	125.2	27 43.5	126.1	10
3 00	32 13.9	124.6	31 33.2	125.4	30 52.1	126.3	30 10.8	127.1	29 29.2	128.0	3 00
2 50	34 01.6	126.6	33 19.7	127.5	32 37.5	128.3	31 55.0	129.1	31 12.1	130.0	2 50
40	35 46.5	128.7	35 03.3	129.6	34 19.9	130.4	33 36.2	131.2	32 52.1	132.0	40
30	37 28.2	130.9	36 43.7	131.8	35 59.1	132.6	35 14.1	133.4	34 28.8	134.2	30
20	39 06.4	133.3	38 20.7	134.1	37 34.7	134.9	36 48.4	135.7	36 01.8	136.5	20
10	40 40.8	135.8	39 53.8	136.6	39 06.5	137.4	38 18.8	138.1	37 30.7	138.9	10
2 00	42 11.1	138.4	41 22.6	139.2	40 33.9	139.9	39 45.0	140.7	38 55.8	141.4	2 00
1 50	43 36.8	141.1	42 47.0	141.9	41 56.9	142.6	41 06.6	143.4	40 16.0	144.0	1 50
40	44 57.3	144.0	44 06.1	144.7	43 14.7	145.4	42 23.1	146.1	41 31.2	146.8	40
30	46 12.4	147.0	45 19.8	147.7	44 27.1	148.3	43 34.1	149.0	42 50.3	149.7	30
20	47 21.4	150.2	46 27.5	150.8	45 33.4	151.4	44 39.3	152.1	43 44.8	152.6	20
10	48 23.9	153.5	47 28.7	154.1	46 33.4	154.7	45 38.0	155.3	44 42.5	155.8	10
1 00	49 19.4	157.0	48 23.0	157.5	47 26.6	158.0	46 30.1	158.5	45 33.4	159.0	1 00
0 50	50 07.2	160.6	49 09.9	161.0	48 12.6	161.5	47 15.0	161.9	46 17.4	162.3	0 50
40	50 47.3	164.3	49 48.9	164.7	48 50.6	165.0	47 52.3	165.4	46 53.8	165.7	40
30	51 18.8	168.1	50 19.7	168.4	49 20.8	168.7	48 21.6	169.0	47 22.5	169.2	30
20	51 41.7	172.0	50 42.1	172.2	49 42.5	172.4	48 42.8	172.6	47 43.3	172.8	20
10	51 55.4	176.0	50 55.5	176.1	49 55.6	176.2	48 55.7	176.3	47 55.8	176.4	10
0 00	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 31.4	107.9	1 01.7	108.8	0 32.2	109.6	0 02.6	110.5			5 20
10	3 37.1	109.1	3 06.8	110.0	2 36.5	110.8	2 06.1	111.7	1 35.8	112.6	10
5 00	5 41.7	110.3	5 10.7	111.2	4 39.7	112.0	4 08.7	112.9	3 37.5	113.8	5 00
4 50	7 45.4	111.6	7 13.7	112.5	6 41.9	113.3	6 10.1	114.2	5 38.2	115.0	4 50
40	9 47.9	112.9	9 15.4	113.8	8 42.9	114.6	8 10.3	115.5	7 37.5	116.3	40
30	11 49.3	114.3	11 16.1	115.1	10 42.7	115.9	10 09.1	116.8	9 35.6	117.6	30
20	13 49.4	115.7	13 15.3	116.5	12 41.0	117.3	12 06.7	118.2	11 32.1	119.0	20
10	15 48.1	117.1	15 13.1	117.9	14 37.9	118.7	14 02.7	119.6	13 27.2	120.4	10
4 00	17 45.2	118.6	17 09.3	119.4	16 33.2	120.2	15 57.0	121.1	15 20.5	121.9	4 00
3 50	19 40.7	120.1	19 03.9	120.9	18 26.8	121.7	17 49.5	122.6	17 12.1	123.4	3 50
40	21 34.4	121.7	20 56.4	122.5	20 18.4	123.3	19 40.2	124.2	19 01.6	125.0	40
30	23 26.1	123.4	22 47.1	124.2	22 08.0	125.0	21 28.8	125.8	20 49.0	126.6	30
20	25 15.5	125.1	24 35.5	125.9	23 55.3	126.7	23 14.9	127.5	22 34.1	128.3	20
10	27 02.7	126.9	26 21.7	127.7	25 40.1	128.5	24 58.7	129.3	24 16.7	130.1	10
3 00	28 47.2	128.8	28 04.9	129.6	27 22.4	130.4	26 39.7	131.2	25 56.6	132.0	3 00
2 50	30 29.1	130.8	29 45.7	131.6	29 01.8	132.4	28 17.8	133.2	27 33.5	134.0	2 50
40	32 07.7	132.8	31 23.0	133.6	30 38.0	134.4	29 52.9	135.2	29 07.4	135.9	40
30	33 43.1	135.0	32 57.2	135.7	32 10.9	136.5	31 24.4	137.3	30 37.7	138.0	30
20	35 14.9	137.3	34 27.6	138.0	33 40.1	138.8	32 52.5	139.5	32 04.5	140.2	20
10	36 42.8	139.7	35 54.3	140.4	35 05.4	141.1	34 16.4	141.8	33 27.2	142.5	10
2 00	38 06.2	142.1	37 16.4	142.8	36 26.4	143.5	35 36.2	144.2	34 45.7	144.9	2 00
1 50	39 25.1	144.7	38 34.1	145.4	37 42.8	146.1	36 51.2	146.7	35 59.6	147.4	1 50
40	40 39.0	147.5	39 46.6	148.1	38 54.1	148.7	38 01.5	149.3	37 08.5	149.9	40
30	41 47.8	150.3	40 54.0	150.9	40 00.1	151.5	39 06.2	152.0	38 12.2	152.6	30
20	42 50.3	153.2	41 55.4	153.8	41 00.5	154.3	40 05.6	154.8	39 10.3	155.3	20
10	43 46.8	156.3	42 50.9	156.8	41 54.9	157.3	40 58.8	157.7	40 02.6	158.2	10
1 00	44 36.7	159.5	43 39.8	159.9	42 42.8	160.3	41 45.8	160.7	40 48.6	161.1	1 00
0 50	45 19.7	162.7	44 21.8	163.1	43 24.0	163.5	42 26.1	163.8	41 28.2	164.2	0 50
40	45 55.4	166.1	44 56.8	166.4	43 58.1	166.7	42 59.6	167.0	42 00.9	167.2	40
30	46 23.4	169.5	45 24.8	169.7	44 25.0	169.9	43 25.8	170.2	42 26.6	170.4	30
20	46 43.6	173.0	45 44.0	173.1	44 44.4	173.2	43 44.8	173.4	42 45.1	173.6	20
10	46 55.9	176.5	45 56.0	176.5	44 56.1	176.6	43 56.2	176.7	42 56.3	176.8	10
0 00	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 05.3	113.4	0 35.0	114.3	0 04.6	115.1					5 10
5 00	3 06.3	114.6	2 35.1	115.5	2 03.9	116.3	1 32.6	117.2	1 01.2	118.0	5 00
4 50	5 06.2	115.9	4 34.1	116.7	4 01.9	117.6	3 29.7	118.4	2 57.6	119.3	4 50
40	7 04.6	117.2	6 31.7	118.0	5 58.6	118.9	5 25.5	119.7	4 52.3	120.5	40
30	9 01.8	118.5	8 27.9	119.3	7 53.9	120.2	7 19.8	121.0	6 45.7	121.8	30
20	10 57.4	119.9	10 22.6	120.7	9 47.7	121.5	9 12.6	122.3	8 37.3	123.1	20
10	12 51.6	121.3	12 15.7	122.1	11 39.7	122.9	11 03.6	123.7	10 27.3	124.5	10
4 00	14 43.9	122.7	14 07.0	123.5	13 30.0	124.3	12 52.9	125.1	12 15.6	125.9	4 00
3 50	16 34.4	124.2	15 56.5	125.0	15 18.3	125.8	14 40.2	126.6	14 01.9	127.4	3 50
40	18 22.8	125.8	17 43.9	126.6	17 04.7	127.4	16 25.4	128.2	15 45.9	129.0	40
30	20 09.2	127.4	19 29.2	128.2	18 48.7	129.0	18 08.4	129.8	17 27.7	130.6	30
20	21 53.2	129.1	21 11.9	129.9	20 30.6	130.7	19 48.9	131.5	19 07.1	132.2	20
10	23 34.7	130.9	22 52.2	131.7	22 09.6	132.4	21 26.9	133.2	20 43.8	133.9	10
3 00	25 13.3	132.7	24 29.8	133.5	23 46.0	134.2	23 02.0	135.0	22 17.8	135.7	3 00
2 50	26 49.1	134.7	26 04.3	135.4	25 19.3	136.1	24 34.1	136.9	23 48.7	137.6	2 50
40	28 21.6	136.7	27 35.7	137.4	26 49.4	138.1	26 03.1	138.8	25 16.4	139.5	40
30	29 50.8	138.8	29 03.6	139.5	28 16.1	140.2	27 28.6	140.9	26 40.7	141.6	30
20	31 16.3	140.9	30 27.8	141.6	29 39.1	142.3	28 50.3	142.9	28 01.2	143.6	20
10	32 37.7	143.2	31 48.0	143.8	30 58.1	144.5	30 08.0	145.1	29 17.8	145.8	10
2 00	33 54.9	145.5	33 04.1	146.1	32 12.9	146.8	31 21.7	147.4	30 30.2	148.0	2 00
1 50	35 07.6	148.0	34 15.5	148.6	33 23.2	149.2	32 30.8	149.7	31 38.2	150.3	1 50
40	36 15.4	150.5	35 22.1	151.1	34 28.6	151.6	33 35.1	152.1	32 41.3	152.7	40
30	37 18.0	153.1	36 23.6	153.7	35 29.0	154.2	34 34.4	154.7	33 39.6	155.2	30
20	38 15.0	155.8	37 19.5	156.3	36 24.0	156.8	35 28.3	157.3	34 32.5	157.7	20
10	39 06.2	158.6	38 09.7	159.1	37 13.3	159.5	36 16.7	159.9	35 20.0	160.3	10
1 00	39 51.4	161.5	38 54.1	161.9	37 56.6	162.3	36 59.1	162.6	36 01.7	163.0	1 00
0 50	40 30.2	164.5	39 32.0	164.8	38 33.8	165.1	37 35.5	165.4	36 37.3	165.7	0 50
40	41 02.1	167.5	40 03.4	167.8	39 04.6	168.0	38 05.7	168.3	37 06.8	168.5	40
30	41 27.3	170.6	40 28.0	170.8	39 28.7	171.0	38 29.4	171.2	37 30.0	171.4	30
20	41 45.4	173.7	40 45.8	173.8	39 46.0	174.0	38 46.3	174.1	37 46.6	174.2	20
10	41 56.4	176.8	40 56.4	176.9	39 56.5	177.0	38 56.6	177.1	37 56.7	177.1	10
0 00	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 29.1	89.1	0 58.2	88.3	1 27.2	87.4	1 56.2	86.5	6 00
5 50	2 11.2	91.2	2 40.2	90.3	3 09.2	89.5	3 38.4	88.6	4 07.3	87.7	5 50
40	4 22.3	92.4	4 51.4	91.6	5 20.6	90.7	5 49.5	89.8	6 18.4	88.9	40
30	6 33.3	93.6	7 02.5	92.8	7 31.6	91.9	8 00.5	91.0	8 29.6	90.1	30
20	8 44.1	94.9	9 13.5	94.0	9 42.8	93.1	10 11.9	92.2	10 40.8	91.3	20
10	10 54.7	96.1	11 24.3	95.3	11 53.6	94.4	12 22.9	93.5	12 51.9	92.6	10
5 00	13 05.0	97.4	13 34.8	96.5	14 04.4	95.6	14 33.7	94.7	15 02.9	93.8	5 00
4 50	15 14.9	98.7	15 44.9	97.8	16 14.7	96.9	16 44.4	96.0	17 13.7	95.1	4 50
40	17 24.4	100.0	17 54.7	99.1	18 24.9	98.2	18 54.7	97.3	19 22.2	96.4	40
30	19 33.2	101.4	20 03.9	100.5	20 34.4	99.6	21 04.6	98.6	21 34.4	97.7	30
20	21 41.5	102.8	22 12.7	101.8	22 43.6	100.9	23 14.1	100.0	23 44.2	99.0	20
10	23 49.2	104.2	24 20.8	103.2	24 52.0	102.3	25 23.0	101.4	25 53.5	100.4	10
4 00	25 56.0	105.6	26 28.1	104.7	26 59.9	103.8	27 31.3	102.8	28 02.3	101.8	4 00
3 50	28 01.8	107.2	28 34.5	106.2	29 06.9	105.3	29 38.9	104.3	30 10.3	103.3	3 50
40	30 06.6	108.8	30 40.0	107.8	31 13.1	106.8	31 45.5	105.8	32 17.6	104.8	40
30	32 10.2	110.4	32 44.2	109.4	33 18.0	108.4	33 51.2	107.4	34 24.0	106.4	30
20	34 12.5	112.1	34 47.4	111.2	35 21.9	110.2	35 55.8	109.1	36 29.2	108.1	20
10	36 13.2	114.0	36 48.9	113.0	37 24.2	112.0	37 59.1	110.9	38 33.2	109.9	10
3 00	38 12.2	115.9	38 48.9	114.9	39 25.2	113.8	40 00.8	112.8	40 35.9	111.7	3 00
2 50	40 09.2	117.9	40 47.0	116.9	41 24.2	115.8	42 01.0	114.8	42 37.0	113.7	2 50
40	42 04.0	120.0	42 42.9	119.0	43 21.3	117.9	43 59.0	116.9	44 36.1	115.8	40
30	43 56.2	122.3	44 36.3	121.3	45 15.8	120.2	45 54.9	119.1	46 33.2	118.0	30
20	45 45.7	124.7	46 27.1	123.7	47 08.0	122.6	47 48.1	121.5	48 27.7	120.4	20
10	47 31.8	127.3	48 14.6	126.3	48 56.8	125.2	49 38.6	124.1	50 19.4	122.9	10
2 00	49 14.4	130.0	49 58.6	129.0	50 42.4	127.9	51 25.5	126.8	52 07.8	125.7	2 00
1 50	50 52.6	133.0	51 38.5	132.0	52 23.8	130.9	53 08.5	129.8	53 52.4	128.6	1 50
40	52 26.2	136.1	53 13.6	135.1	54 00.7	134.1	54 46.9	133.0	55 32.6	131.8	40
30	53 54.2	139.5	54 43.4	138.5	55 32.0	137.5	56 20.2	136.4	57 07.6	135.3	30
20	55 16.4	143.1	56 07.2	142.2	56 57.7	141.2	57 47.5	140.1	58 36.9	139.1	20
10	56 31.4	147.0	57 24.0	146.1	58 16.2	145.2	59 08.1	144.2	59 59.2	143.2	10
1 00	57 39.1	151.1	58 33.3	150.3	59 27.4	149.4	60 20.8	148.5	61 13.8	147.6	1 00
0 50	58 38.2	155.4	59 34.0	154.7	60 29.6	154.0	61 24.9	153.2	62 19.6	152.3	0 50
40	59 28.0	160.0	60 25.0	159.4	61 22.3	158.8	62 19.0	158.1	63 15.6	157.4	40
30	60 07.7	164.8	61 06.0	164.3	62 04.2	163.8	63 02.4	163.3	64 00.2	162.7	30
20	60 36.5	169.8	61 35.8	169.5	62 35.1	169.1	63 34.1	168.7	64 33.2	168.3	20
10	60 54.1	174.9	61 53.9	174.7	62 53.7	174.5	63 53.5	174.3	64 53.3	174.1	10
0 00	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 01.9	79.7	6 20
10	0 14.6	84.4	0 43.8	83.5	1 12.9	82.7	1 42.1	81.8	2 11.2	80.9	10
6 00	2 25.3	85.6	2 54.2	84.8	3 23.2	83.9	3 52.1	83.0	4 21.0	82.1	6 00
5 50	4 36.2	86.8	5 05.1	86.0	5 33.8	85.1	6 02.5	84.2	6 31.2	83.3	5 50
40	6 47.3	88.0	7 16.0	87.2	7 44.6	86.3	8 13.1	85.4	8 41.6	84.5	40
30	8 58.4	89.2	9 27.1	88.4	9 55.6	87.5	10 24.0	86.6	10 52.3	85.7	30
20	11 09.6	90.5	11 38.2	89.6	12 06.8	88.7	12 35.0	87.8	13 03.2	86.8	20
10	13 20.8	91.7	13 49.4	90.8	14 17.9	89.9	14 46.2	89.0	15 14.3	88.0	10
5 00	15 31.9	92.9	16 00.5	92.0	16 29.1	91.1	16 57.3	90.2	17 25.4	89.2	5 00
4 50	17 42.8	94.2	18 11.7	93.2	18 40.2	92.3	19 08.6	91.4	19 36.6	90.4	4 50
40	19 53.5	95.4	20 22.5	94.5	20 51.3	93.5	21 19.6	92.6	21 47.8	91.6	40
30	22 04.0	96.7	22 33.2	95.8	23 02.2	94.8	23 30.6	93.9	23 58.8	92.9	30
20	24 14.1	98.0	24 43.5	97.1	25 12.7	96.1	25 41.4	95.2	26 09.8	94.2	20
10	26 23.8	99.4	26 53.5	98.5	27 23.0	97.5	27 51.9	96.5	28 20.5	95.5	10
4 00	28 32.9	100.8	29 03.0	99.9	29 32.8	98.9	30 02.1	97.9	30 31.0	96.8	4 00
3 50	30 41.3	102.3	31 12.0	101.3	31 42.1	100.3	32 11.8	99.3	32 41.0	98.2	3 50
40	32 49.2	103.8	33 20.3	102.8	33 50.9	101.8	34 21.0	100.7	34 50.6	99.6	40
30	34 56.2	105.4	35 27.9	104.4	35 59.0	103.3	36 29.6	102.2	36 59.6	101.1	30
20	37 02.1	107.1	37 34.4	106.0	38 06.2	104.9	38 37.3	103.8	39 08.0	102.7	20
10	39 06.9	108.8	39 40.0	107.7	40 12.5	106.6	40 44.4	105.5	41 15.6	104.4	10
3 00	41 10.4	110.6	41 44.3	109.5	42 17.6	108.4	42 50.1	107.3	43 22.1	106.1	3 00
2 50	43 12.3	112.6	43 47.2	111.5	44 21.3	110.3	44 54.8	109.2	45 27.6	108.0	2 50
40	45 12.7	114.6	45 48.4	113.5	46 23.6	112.3	46 57.9	111.1	47 31.6	109.9	40
30	47 10.8	116.8	47 47.8	115.7	48 23.9	114.5	48 59.4	113.2	49 34.1	112.0	30
20	49 06.6	119.2	49 44.8	118.0	50 22.2	116.8	50 58.9	115.6	51 34.7	114.3	20
10	50 59.6	121.7	51 39.2	120.5	52 18.0	119.3	52 56.0	118.0	53 33.2	116.7	10
2 00	52 49.6	124.5	53 30.6	123.3	54 10.9	122.0	54 50.3	120.7	55 29.1	119.4	2 00
1 50	54 35.8	127.5	55 18.5	126.2	56 00.4	124.9	56 41.5	123.6	57 21.7	122.3	1 50
40	56 17.7	130.7	57 02.0	129.4	57 45.8	128.1	58 28.6	126.8	59 10.8	125.4	40
30	57 54.6	134.2	58 40.9	132.9	59 26.4	131.7	60 11.3	130.4	60 55.3	128.9	30
20	59 25.8	138.0	60 13.9	136.8	61 01.6	135.5	61 48.3	134.2	62 34.4	132.8	20
10	60 50.1	142.1	61 40.2	140.9	62 29.9	139.7	63 18.8	138.5	64 07.1	137.1	10
1 00	62 06.6	146.6	62 58.8	145.5	63 50.7	144.4	64 41.8	143.2	65 32.6	141.9	1 00
0 50	63 14.2	151.4	64 08.5	150.4	65 02.4	149.4	65 55.7	148.3	66 48.8	147.1	0 50
40	64 11.9	156.6	65 07.9	155.7	66 03.8	154.9	66 59.2	153.9	67 54.5	152.9	40
30	64 58.1	162.1	65 55.9	161.4	66 53.5	160.7	67 50.7	160.0	68 48.0	159.1	30
20	65 32.2	167.9	66 31.0	167.4	67 30.0	166.9	68 28.7	166.4	69 27.5	165.8	20
10	65 53.1	173.9	66 52.7	173.7	67 52.5	173.4	68 52.1	173.1	69 51.8	172.8	10
0 00	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 22.3	74.2	6 30
20	0 31.4	78.8	1 00.8	78.0	1 30.2	77.1	1 59.7	76.2	2 29.0	75.3	20
10	2 40.3	80.1	3 09.4	79.2	3 38.4	78.3	4 07.4	77.4	4 36.3	76.5	10
6 00	4 49.7	81.2	5 18.5	80.4	5 47.0	79.5	6 15.7	78.6	6 44.1	77.7	6 00
5 50	6 59.6	82.4	7 28.1	81.5	7 56.4	80.6	8 24.4	79.8	8 52.6	78.9	5 50
40	9 09.8	83.6	9 38.0	82.7	10 05.9	81.8	10 33.8	80.9	11 01.6	80.0	40
30	11 20.3	84.8	11 48.2	83.9	12 16.0	83.0	12 43.5	82.1	13 11.0	81.1	30
20	13 31.1	85.9	13 58.9	85.0	14 26.3	84.1	14 53.6	83.2	15 20.8	82.2	20
10	15 42.1	87.1	16 09.6	86.2	16 37.1	85.3	17 04.1	84.4	17 31.0	83.4	10
5 00	17 53.1	88.3	18 20.7	87.4	18 47.8	86.4	19 14.7	85.5	19 41.4	84.5	5 00
4 50	20 04.3	89.5	20 31.7	88.6	20 58.8	87.6	21 25.7	86.7	21 52.1	85.7	4 50
40	22 15.5	90.7	22 43.0	89.8	23 09.9	88.8	23 36.6	87.8	24 03.0	86.8	40
30	24 26.7	91.9	24 54.0	91.0	25 21.2	90.0	25 47.8	89.0	26 14.1	88.0	30
20	26 37.7	93.2	27 05.3	92.2	27 32.3	91.2	27 59.0	90.2	28 25.3	89.2	20
10	28 48.6	94.5	29 16.2	93.5	29 43.4	92.4	30 10.1	91.4	30 36.3	90.4	10
4 00	30 59.3	95.8	31 27.2	94.8	31 54.4	93.7	32 21.2	92.7	32 47.6	91.6	4 00
3 50	33 09.6	97.2	33 37.7	96.1	34 05.3	95.1	34 32.3	94.0	34 58.7	92.9	3 50
40	35 19.5	98.6	35 48.0	97.5	36 15.7	96.4	36 42.9	95.3	37 09.7	94.2	40
30	37 29.0	100.1	37 57.8	99.0	38 26.0	97.8	38 53.5	96.7	39 20.3	95.5	30
20	39 47.8	101.6	40 07.2	100.5	40 35.6	99.3	41 03.5	98.2	41 30.8	97.0	20
10	41 46.0	103.2	42 15.8	102.1	42 44.8	100.9	43 13.1	99.7	43 40.8	98.5	10
3 00	43 53.2	104.9	44 23.8	103.7	44 53.3	102.5	45 22.1	101.3	45 50.3	100.0	3 00
2 50	45 59.4	106.7	46 30.6	105.5	47 00.8	104.3	47 30.5	103.0	47 59.0	101.7	2 50
40	48 04.4	108.7	48 36.5	107.4	49 07.5	106.1	49 37.8	104.8	50 07.2	103.4	40
30	50 07.9	110.7	50 40.9	109.4	51 13.0	108.1	51 44.1	106.7	52 14.3	105.3	30
20	52 09.7	112.9	52 43.9	111.6	53 16.8	110.2	53 49.0	108.8	54 20.2	107.3	20
10	54 09.4	115.3	54 44.7	114.0	55 19.1	112.6	55 52.5	111.1	56 24.7	109.6	10
2 00	56 06.6	118.0	56 43.5	116.6	57 19.0	115.1	57 53.6	113.6	58 27.3	112.0	2 00
1 50	58 01.0	120.9	58 39.4	119.4	59 16.6	117.9	59 52.8	116.3	60 27.8	114.7	1 50
40	59 51.7	124.0	60 31.9	122.5	61 10.8	121.0	61 48.7	119.3	62 25.5	117.6	40
30	61 38.3	127.5	62 20.3	126.0	63 01.3	124.4	63 41.3	122.7	64 20.0	121.0	30
20	63 19.5	131.4	64 04.1	129.9	64 47.0	128.3	65 29.1	126.6	66 10.3	124.8	20
10	64 54.7	135.7	65 41.5	134.2	66 26.8	132.6	67 11.6	130.9	67 55.0	129.1	10
1 00	66 22.3	140.5	67 11.6	139.1	67 59.6	137.5	68 47.0	135.8	69 33.4	134.0	1 00
0 50	67 41.0	145.9	68 32.8	144.5	69 23.6	143.0	70 13.8	141.4	71 03.0	139.7	0 50
40	68 49.0	151.8	69 43.5	150.5	70 37.0	149.2	71 29.8	147.8	72 22.3	146.2	40
30	69 44.6	158.2	70 41.2	157.2	71 37.2	156.1	72 32.8	154.9	73 28.0	153.6	30
20	70 25.9	165.2	71 24.5	164.5	72 22.2	163.7	73 20.2	162.8	74 18.0	161.8	20
10	70 51.4	172.5	71 51.0	172.1	72 50.5	171.7	73 49.9	171.2	74 49.3	170.7	10
0 00	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

39° 37′ 8

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 18.5	69.5	0 48.9	68.6	6 40
30	0 52.3	73.3	1 22.1	72.4	1 51.9	71.6	2 21.8	70.7	2 51.6	69.8	30
20	2 58.3	74.5	3 27.6	73.6	3 56.8	72.7	4 26.1	71.9	4 55.3	71.0	20
10	5 05.1	75.7	5 33.8	74.8	6 02.5	73.9	6 31.1	73.0	6 59.6	72.1	10
6 00	7 12.5	76.8	7 40.8	75.9	8 08.9	75.0	8 37.0	74.1	9 04.9	73.2	6 00
5 50	9 20.6	78.0	9 48.3	77.1	10 16.0	76.2	10 43.4	75.2	11 10.8	74.3	5 50
40	11 29.1	79.1	11 56.5	78.2	12 23.7	77.3	12 50.7	76.4	13 17.5	75.4	40
30	13 38.1	80.2	14 05.0	79.3	14 31.8	78.4	14 58.4	77.5	15 24.7	76.5	30
20	15 47.6	81.3	16 14.3	80.4	16 40.7	79.5	17 06.8	78.5	17 32.7	77.6	20
10	17 57.6	82.4	18 23.8	81.5	18 49.9	80.6	19 15.6	79.6	19 41.0	78.6	10
5 00	20 07.7	83.6	20 33.8	82.6	20 59.5	81.6	21 24.8	80.7	21 49.9	79.7	5 00
4 50	22 18.4	84.7	22 44.0	83.7	23 09.4	82.7	23 35.0	81.7	23 59.2	80.7	4 50
40	24 29.0	85.8	24 54.6	84.8	25 19.8	83.8	25 44.5	82.8	26 08.9	81.8	40
30	26 39.9	86.9	27 05.1	85.9	27 30.1	84.9	27 54.8	83.9	28 18.7	82.9	30
20	28 51.0	88.1	29 16.3	87.1	29 41.1	86.1	30 05.4	85.0	30 29.2	83.9	20
10	31 02.1	89.3	31 27.3	88.3	31 52.0	87.2	32 16.1	86.1	32 39.7	85.0	10
4 00	33 13.3	90.5	33 38.5	89.5	34 03.1	88.4	34 27.1	87.2	34 50.7	86.1	4 00
3 50	35 24.5	91.8	35 49.6	90.7	36 14.1	89.5	36 38.1	88.4	37 01.5	87.2	3 50
40	37 35.6	93.1	38 00.9	91.9	38 25.5	90.7	38 49.4	89.6	39 12.7	88.4	40
30	39 46.4	94.4	40 11.9	93.2	40 36.6	92.0	41 00.6	90.8	41 23.7	89.6	30
20	41 57.1	95.7	42 22.8	94.5	42 47.7	93.3	43 11.7	92.1	43 35.1	90.8	20
10	44 07.7	97.2	44 33.4	95.9	44 58.5	94.7	45 22.7	93.4	45 45.9	92.1	10
3 00	46 17.4	98.7	46 43.7	97.4	47 09.2	96.1	47 33.7	94.7	47 57.3	93.4	3 00
2 50	48 26.8	100.3	48 53.7	99.0	49 19.3	97.6	49 44.1	96.2	50 08.0	94.8	2 50
40	50 35.6	102.0	51 02.9	100.6	51 29.3	99.2	51 54.4	97.7	52 18.7	96.2	40
30	52 43.4	103.9	53 11.4	102.4	53 38.4	100.9	54 04.3	99.4	54 28.7	97.8	30
20	54 50.2	105.9	55 19.1	104.3	55 46.9	102.7	56 13.3	101.1	56 38.6	99.5	20
10	56 55.8	108.0	57 25.5	106.4	57 54.1	104.8	58 21.8	103.1	58 47.5	101.3	10
2 00	58 59.7	110.4	59 30.7	108.7	60 00.5	107.0	60 28.9	105.2	60 55.8	103.4	2 00
1 50	61 01.5	113.0	61 33.9	111.2	62 05.1	109.4	62 34.8	107.5	63 02.6	105.6	1 50
40	63 01.1	115.9	63 35.2	114.0	64 07.8	112.1	64 38.8	110.2	65 08.4	108.1	40
30	64 57.5	119.2	65 33.2	117.3	66 08.0	115.3	66 40.8	113.2	67 12.0	111.0	30
20	66 49.9	122.9	67 28.1	120.9	68 04.9	118.8	68 39.8	116.6	69 13.2	114.3	20
10	68 37.4	127.2	69 18.0	125.1	69 57.2	123.0	70 35.0	120.7	71 10.6	118.2	10
1 00	70 18.3	132.1	71 02.3	130.1	71 44.4	127.8	72 25.0	125.4	73 04.1	122.8	1 00
0 50	71 51.5	137.8	72 38.0	135.8	73 24.0	133.5	74 08.5	131.2	74 50.5	128.4	0 50
40	73 13.8	144.4	74 04.3	142.5	74 53.7	140.3	75 41.7	138.1	76 28.2	135.3	40
30	74 23.0	152.0	75 16.5	150.4	76 09.8	148.5	77 02.0	146.4	77 53.2	143.8	30
20	75 15.5	160.6	76 12.5	159.4	77 09.1	157.9	78 05.4	156.3	79 00.8	154.4	20
10	75 48.7	170.1	76 47.8	169.4	77 47.0	168.6	78 45.9	167.7	79 44.6	166.6	10
0 00	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50					0 20.9	64.9	0 52.2	64.0	1 23.4	63.2	6 50
40	1 19.4	67.8	1 49.9	66.9	2 20.3	66.1	2 50.7	65.2	3 21.0	64.3	40
30	3 21.3	69.0	3 51.1	68.1	4 20.6	67.2	4 50.2	66.3	5 19.9	65.4	30
20	5 24.2	70.1	5 53.3	69.2	6 22.2	68.3	6 51.0	67.5	7 19.7	66.5	20
10	7 28.0	71.2	7 56.3	70.3	8 24.5	69.4	8 52.6	68.6	9 20.6	67.6	10
6 00	9 32.7	72.3	10 00.3	71.4	10 27.8	70.5	10 55.2	69.6	11 22.3	68.7	6 00
5 50	11 38.1	73.4	12 05.0	72.5	12 31.9	71.6	12 58.5	70.7	13 25.0	69.8	5 50
40	13 44.2	74.5	14 10.6	73.6	14 36.8	72.7	15 02.7	71.7	15 28.5	70.8	40
30	15 50.8	75.6	16 16.7	74.6	16 42.4	73.7	17 07.7	72.8	17 32.8	71.8	30
20	17 58.3	76.6	18 23.5	75.7	18 48.5	74.7	19 13.3	73.8	19 37.8	72.8	20
10	20 06.2	77.7	20 30.9	76.7	20 55.5	75.7	21 19.6	74.8	21 43.5	73.8	10
5 00	22 14.6	78.7	22 38.9	77.7	23 02.8	76.7	23 26.5	75.7	23 49.7	74.7	5 00
4 50	24 23.5	79.7	24 47.3	78.7	25 10.7	77.7	25 33.8	76.7	25 56.5	75.7	4 50
40	26 32.8	80.8	26 56.2	79.7	27 19.2	78.7	27 41.7	77.7	28 03.8	76.6	40
30	28 42.3	81.8	29 05.5	80.8	29 28.0	79.7	29 50.2	78.6	30 11.7	77.6	30
20	30 52.5	82.9	31 15.1	81.8	31 37.3	80.7	31 59.0	79.6	32 20.1	78.5	20
10	33 02.7	83.9	33 25.2	82.8	33 46.9	81.7	34 08.2	80.6	34 28.9	79.4	10
4 00	35 13.4	85.0	35 35.4	83.9	35 57.0	82.7	36 17.8	81.5	36 38.0	80.4	4 00
3 50	37 24.1	86.1	37 46.1	84.9	38 07.2	83.7	38 27.7	82.5	38 47.5	81.3	3 50
40	39 35.1	87.2	39 56.8	86.0	40 17.8	84.8	40 38.0	83.5	40 57.4	82.3	40
30	41 46.1	88.3	42 07.7	87.1	42 28.5	85.8	42 48.6	84.5	43 07.5	83.3	30
20	43 57.4	89.5	44 18.8	88.2	44 39.5	86.9	44 59.2	85.6	45 17.9	84.2	20
10	46 08.5	90.7	46 30.0	89.4	46 50.6	88.0	47 10.0	86.6	47 28.6	85.2	10
3 00	48 19.8	92.0	48 41.1	90.6	49 01.7	89.1	49 21.0	87.7	49 39.4	86.3	3 00
2 50	50 30.7	93.3	50 52.3	91.8	51 12.7	90.3	51 32.1	88.8	51 50.2	87.3	2 50
40	52 41.6	94.7	53 03.4	93.2	53 24.1	91.6	53 43.4	90.0	54 01.5	88.4	40
30	54 52.1	96.2	55 14.2	94.6	55 35.1	93.0	55 54.5	91.3	56 12.6	89.6	30
20	57 02.5	97.8	57 24.9	96.1	57 46.1	94.4	58 05.6	92.6	58 23.8	90.8	20
10	59 12.0	99.6	59 35.1	97.8	59 56.6	95.9	60 16.6	94.0	60 34.9	92.1	10
2 00	61 21.2	101.5	61 44.9	99.6	62 07.1	97.6	62 27.4	95.6	62 46.1	93.5	2 00
1 50	63 29.1	103.6	63 53.7	101.6	64 16.6	99.4	64 37.7	97.3	64 56.9	95.0	1 50
40	65 36.2	106.0	66 01.8	103.8	66 25.7	101.5	66 47.5	99.2	67 07.4	96.8	40
30	67 41.2	108.7	68 08.5	106.3	68 33.5	103.9	68 56.7	101.3	69 17.2	98.8	30
20	69 44.4	111.9	70 13.5	109.3	70 40.2	106.6	71 04.6	103.8	71 26.6	100.9	20
10	71 44.2	115.6	72 16.0	112.8	72 45.0	109.9	73 11.2	106.9	73 34.7	103.6	10
1 00	73 40.7	120.1	74 14.8	117.0	74 46.6	113.9	75 15.5	110.6	75 41.2	107.0	1 00
0 50	75 30.7	125.6	76 08.5	122.3	76 44.0	119.0	77 16.5	115.3	77 45.5	111.2	0 50
40	77 12.8	132.5	77 55.1	129.0	78 35.3	125.5	79 12.1	121.5	79 45.4	116.9	40
30	78 42.5	141.2	79 30.5	138.0	80 16.0	134.3	80 59.0	130.0	81 38.5	125.0	30
20	79 55.1	152.1	80 48.6	149.4	81 40.5	146.1	82 30.4	142.0	83 17.5	137.0	20
10	80 43.1	165.3	81 41.2	163.6	82 38.8	161.6	83 35.6	158.9	84 31.4	155.3	10
0 00	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	85 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 11.2	91.2	1 42.1	92.1	1 12.8	93.0	0 43.8	93.8	0 14.6	94.7	5 50
40	4 22.3	92.4	3 53.1	93.3	3 23.9	94.2	2 54.6	95.0	2 25.2	95.9	40
30	6 33.3	93.6	6 04.0	94.5	5 34.5	95.4	5 05.1	96.3	4 35.6	97.2	30
20	8 44.1	94.9	8 14.7	95.8	7 45.1	96.7	7 15.3	97.5	6 45.5	98.4	20
10	10 54.7	96.1	10 25.1	97.0	9 55.2	97.9	9 25.2	98.8	8 55.2	99.7	10
5 00	13 05.0	97.4	12 35.0	98.3	12 05.0	99.2	11 34.6	100.1	11 04.2	100.9	5 00
4 50	15 14.9	98.7	14 44.6	99.6	14 14.1	100.5	13 43.6	101.4	13 12.8	102.2	4 50
40	17 24.4	100.0	16 53.7	100.9	16 23.0	101.8	15 51.9	102.7	15 20.5	103.6	40
30	19 33.2	101.4	19 02.2	102.3	18 31.0	103.2	17 59.4	104.1	17 27.8	105.0	30
20	21 41.5	102.8	21 10.1	103.7	20 38.4	104.6	20 06.4	105.5	19 34.0	106.4	20
10	23 49.2	104.2	23 17.2	105.1	22 44.8	106.0	22 12.3	106.9	21 39.4	107.8	10
4 00	25 56.0	105.6	25 23.4	106.6	24 50.6	107.5	24 17.4	108.4	23 43.8	109.3	4 00
3 50	28 01.8	107.2	27 28.6	108.1	26 55.1	109.0	26 21.2	110.0	25 47.1	110.9	3 50
40	30 06.6	108.8	29 32.8	109.7	28 58.6	110.6	28 23.9	111.6	27 48.9	112.5	40
30	32 10.2	110.4	31 35.6	111.4	31 00.6	112.3	30 25.2	113.3	29 49.4	114.2	30
20	34 12.5	112.1	33 37.0	113.1	33 01.3	114.1	32 24.9	115.0	31 48.2	115.9	20
10	36 13.2	114.0	35 36.8	114.9	35 00.1	115.9	34 22.9	116.9	33 45.2	117.8	10
3 00	38 12.2	115.9	37 34.9	116.8	36 57.1	117.8	36 18.9	118.8	35 40.2	119.7	3 00
2 50	40 09.2	117.9	39 30.9	118.9	38 52.0	119.9	38 12.8	120.9	37 32.8	121.8	2 50
40	42 04.0	120.0	41 24.6	121.0	40 44.6	122.0	40 04.1	123.0	39 23.1	123.9	40
30	43 56.2	122.3	43 15.6	123.3	42 34.3	124.3	41 52.7	125.3	41 10.6	126.2	30
20	45 45.7	124.7	45 03.7	125.7	44 21.2	126.7	43 38.2	127.7	42 54.7	128.6	20
10	47 31.8	127.3	46 48.5	128.3	46 04.6	129.3	45 20.2	130.3	44 35.5	131.2	10
2 00	49 14.4	130 0	48 29.5	131.0	47 44.2	132.0	46 58.4	133.0	46 12.0	133.9	2 00
1 50	50 52.6	133.0	50 06.2	134.0	49 19.4	134.9	48 32.1	135.9	47 44.4	136.8	1 50
40	52 26.2	136.1	51 38.1	137.1	50 49.9	138.0	50 00.9	138.9	49 11.6	139.8	40
30	53 54.2	139.5	53 04.6	140.5	52 14.6	141.4	51 24.2	142.2	50 33.4	143.1	30
20	55 16.4	143.1	54 25.1	144.0	53 33.4	144.9	52 41.5	145.7	51 49.0	146.5	20
10	56 31.4	147.0	55 38.6	147.8	54 45.4	148.6	53 51.9	149.4	52 58.1	150.1	10
1 00	57 39.1	151.1	56 44.6	151.8	55 50.0	152.6	54 54.9	153.3	53 59.4	153.9	1 00
0 50	58 38.2	155.4	57 42.2	156.1	56 46.0	156.7	55 49.6	157.4	54 53.1	158.0	0 50
40	59 28.0	160.0	58 30.5	160.6	57 33.3	161.1	56 35.6	161.6	55 37.8	162.1	40
30	60 07.7	164.8	59 09.2	165.3	58 10.6	165.7	57 12.0	166.1	56 13.4	166.5	30
20	60 36.5	169.8	59 37.3	170.1	58 38.0	170.4	57 38.6	170.6	56 39.1	170.9	20
10	60 54.1	174.9	59 54.3	175.0	58 54.6	175.2	57 54.6	175.3	56 54.8	175.4	10
0 00	61 0.0	180.0	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 55.8	96.8	1 26.4	97.7	0 57.0	98.5	0 27.5	99.4			5 40
30	4 05.9	98.0	3 36.2	98.9	3 06.5	99.7	2 36.7	100.6	2 06.9	101.5	30
20	6 15.6	99.3	5 45.6	100.2	5 15.6	101.0	4 45.4	101.9	4 15.2	102.8	20
10	8 24.9	100.5	7 54.6	101.4	7 24.1	102.2	6 53.5	103.1	6 22.9	104.0	10
5 00	10 33.6	101.8	10 02.8	102.7	9 31.9	103.5	9 00.9	104.4	8 29.8	105.3	5 00
4 50	12 41.7	103.1	12 10.5	104.0	11 39.1	104.8	11 07.6	105.7	10 35.9	106.6	4 50
40	14 49.0	104.5	14 17.4	105.3	13 45.5	106.2	13 13.4	107.1	12 41.2	108.0	40
30	16 55.8	105.9	16 23.5	106.7	15 51.1	107.6	15 18.4	108.5	14 45.5	109.3	30
20	19 01.4	107.3	18 28.6	108.1	17 55.6	109.0	17 22.3	109.9	16 48.8	110.8	20
10	21 06.2	108.7	20 32.8	109.6	19 59.2	110.5	19 25.1	111.4	18 50.8	112.2	10
4 00	23 09.9	110.2	22 35.7	111.1	22 01.3	112.0	21 26.6	112.9	20 51.7	113.7	4 00
3 50	25 12.4	111.8	24 37.5	112.7	24 02.3	113.6	23 26.8	114.4	22 51.0	115.3	3 50
40	27 13.5	113.4	26 37.8	114.3	26 01.8	115.2	25 25.4	116.1	24 48.8	117.0	40
30	29 13.2	115.1	28 36.7	116.0	27 59.6	116.9	27 22.4	117.8	26 44.8	118.7	30
20	31 11.1	116.9	30 33.5	117.8	29 55.7	118.7	29 17.4	119.6	28 39.0	120.4	20
10	33 07.2	118.7	32 28.7	119.6	31 49.8	120.5	31 10.6	121.4	30 31.1	122.3	10
3 00	35 01.1	120.7	34 21.5	121.6	33 41.7	122.5	33 01.3	123.4	32 20.7	124.3	3 00
2 50	36 52.8	122.7	36 12.2	123.6	35 31.0	124.5	34 49.6	125.4	34 07.8	126.3	2 50
40	38 41.7	124.9	37 59.9	125.8	37 17.7	126.7	36 35.0	127.6	35 52.1	128.5	40
30	40 27.9	127.2	39 44.9	128.1	39 01.3	129.0	38 17.5	129.8	37 33.2	130.7	30
20	42 10.8	129.6	41 26.4	130.5	40 41.7	131.3	39 56.4	132.2	39 10.9	133.1	20
10	43 50.1	132.1	43 04.4	133.0	42 18.2	133.8	41 31.7	134.7	40 44.9	135.5	10
2 00	45 25.4	134.8	44 38.2	135.7	43 50.7	136.5	43 02.8	137.4	42 14.7	138.2	2 00
1 50	46 56.1	137.6	46 07.6	138.5	45 18.7	139.3	44 29.4	140.1	43 39.8	140.9	1 50
40	48 21.9	140.7	47 31.8	141.5	46 41.6	142.3	45 50.8	143.1	44 59.9	143.8	40
30	49 42.9	143.9	48 50.8	144.7	47 58.9	145.4	47 06.9	146.2	46 14.6	146.9	30
20	50 56.4	147.3	50 03.4	148.0	49 10.3	148.7	48 16.8	149.4	47 23.1	150.1	20
10	52 04.0	150.8	51 09.6	151.5	50 15.0	152.2	49 20.1	152.8	48 25.1	153.4	10
1 00	53 04.0	154.6	52 08.3	155.2	51 12.6	155.8	50 16.5	156.4	49 20.4	156.9	1 00
0 50	53 56.2	158.5	52 59.5	159.1	52 02.4	159.6	51 05.2	160.1	50 08.0	160.5	0 50
40	54 40.0	162.6	53 42.0	163.0	52 44.0	163.5	51 45.9	163.9	50 47.8	164.2	40
30	55 14.6	166.9	54 15.9	167.2	53 17.0	167.5	52 18.1	167.8	51 19.1	168.1	30
20	55 39.6	171.2	54 40.2	171.4	53 40.8	171.6	52 41.2	171.8	51 41.8	172.0	20
10	55 54.9	175.6	54 55.1	175.7	53 55.2	175.8	52 55.3	175.9	51 55.4	176.0	10
0 00	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 37.0	102.4	1 07.2	103.2	0 37.3	104.1	0 07.4	105.0			5 30
20	3 44.9	103.6	3 14.6	104.5	2 44.2	105.3	2 13.8	106.2	1 43.4	107.1	20
10	5 52.1	104.9	5 21.3	105.7	4 50.4	106.6	4 19.4	107.5	3 48.5	108.3	10
5 00	7 58.5	106.2	7 27.2	107.0	6 55.7	107.9	6 24.1	108.7	5 52.5	109.6	5 00
4 50	10 04.1	107.5	9 32.1	108.3	9 00.0	109.2	8 27.9	110.0	7 55.7	110.9	4 50
40	12 08.8	108.8	11 36.2	109.7	11 03.4	110.5	10 30.6	111.4	9 57.6	112.2	40
30	14 12.5	110.1	13 39.1	111.0	13 05.7	111.9	12 32.1	112.8	11 58.5	113.6	30
20	16 15.0	111.6	15 41.1	112.5	15 06.8	113.3	14 32.5	114.2	13 58.0	115.0	20
10	18 16.3	113.1	17 41.6	114.0	17 06.6	114.8	16 31.5	115.7	15 56.1	116.5	10
4 00	20 16.3	114.6	19 40.9	115.5	19 05.0	116.3	18 29.0	117.2	17 52.8	118.0	4 00
3 50	22 14.8	116.2	21 38.4	117.1	21 01.8	117.9	20 24.9	118.8	19 47.9	119.6	3 50
40	24 11.8	117.8	23 34.5	118.7	22 56.9	119.5	22 19.0	120.4	21 41.0	121.2	40
30	26 06.8	119.5	25 28.6	120.4	24 50.1	121.2	24 11.2	122.1	23 32.2	122.9	30
20	28 00.0	121.3	27 20.7	122.2	26 41.2	123.0	26 01.3	123.8	25 21.2	124.7	20
10	29 50.9	123.2	29 10.7	124.0	28 30.0	124.9	27 49.1	125.7	27 08.0	126.5	10
3 00	31 39.5	125.1	30 58.2	125.9	30 16.4	126.8	29 34.3	127.6	28 52.1	128.4	3 00
2 50	33 25.5	127.1	32 43.0	127.9	32 00.1	128.8	31 16.9	129.6	30 33.4	130.4	2 50
40	35 08.6	129.3	34 24.9	130.1	33 40.8	130.9	32 56.4	131.7	32 11.7	132.5	40
30	36 48.5	131.5	36 03.5	132.3	35 18.3	133.1	34 32.7	133.9	33 46.8	134.7	30
20	38 25.0	133.9	37 38.8	134.7	36 52.1	135.5	36 05.2	136.2	35 18.1	137.0	20
10	39 57.5	136.3	39 10.0	137.1	38 22.1	137.9	37 34.1	138.6	36 45.6	139.4	10
2 00	41 26.0	138.9	40 37.2	139.7	39 47.9	140.5	38 58.3	141.2	38 08.7	141.9	2 00
1 50	42 49.8	141.7	41 59.5	142.4	41 09.0	143.1	40 18.2	143.8	39 27.3	144.5	1 50
40	44 08.5	144.6	43 17.0	145.3	42 25.2	145.9	41 33.0	146.6	40 40.8	147.3	40
30	45 21.8	147.6	44 28.9	148.2	43 35.8	148.9	42 42.6	149.5	41 49.1	150.1	30
20	46 29.1	150.7	45 35.0	151.3	44 40.6	151.9	43 46.0	152.5	42 51.5	153.1	20
10	47 30.0	154.0	46 34.8	154.6	45 39.1	155.1	44 43.5	155.6	43 47.7	156.2	10
1 00	48 24.0	157.4	47 27.6	157.9	46 30.9	158.4	45 34.1	158.9	44 37.4	159.3	1 00
0 50	49 10.6	161.0	48 13.2	161.4	47 15.5	161.8	46 17.9	162.2	45 20.2	162.6	0 50
40	49 49.3	164.6	48 51.2	165.0	47 52.6	165.3	46 54.1	165.7	45 55.7	166.0	40
30	50 20.0	168.4	49 21.0	168.7	48 21.8	168.9	47 22.7	169.2	46 23.7	169.4	30
20	50 42.2	172.2	49 42.6	172.4	48 42.9	172.6	47 43.3	172.7	46 43.7	172.9	20
10	50 55.5	176.1	49 55.7	176.2	48 55.8	176.3	47 55.9	176.4	46 56.0	176.5	10
0 00	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 12.9	107.9	0 42.5	108.8	0 12.0	109.7					5 20
10	3 17.1	109.1	2 46.1	110.0	2 15.1	110.9	1 43.9	111.7	1 12.7	112.6	10
5 00	5 20.8	110.4	4 49.0	111.3	4 17.1	112.1	3 45.2	113.0	3 13.3	113.8	5 00
4 50	7 23.2	111.7	6 50.8	112.6	6 18.1	113.4	5 45.4	114.3	5 12.8	115.1	4 50
40	9 24.5	113.1	8 51.3	113.9	8 17.9	114.7	7 10.9	115.6	7 37.2	116.4	40
30	11 24.6	114.5	10 50.4	115.3	10 16.3	116.1	9 42.1	117.0	9 07.6	117.8	30
20	13 23.4	115.9	12 48.5	116.7	12 13.5	117.5	11 38.3	118.4	11 03.0	119.2	20
10	15 20.6	117.3	14 44.9	118.2	14 09.0	119.0	13 32.9	119.8	12 56.7	120.6	10
4 00	17 16.4	118.8	16 39.8	119.7	16 02.9	120.5	15 25.9	121.3	14 48.8	122.1	4 00
3 50	19 10.6	120.4	18 32.8	121.2	17 55.0	122.0	17 17.0	122.9	16 38.9	123.7	3 50
40	21 02.7	122.0	20 24.1	122.9	19 45.3	123.7	19 06.3	124.5	18 27.1	125.3	40
30	22 52.9	123.7	22 13.2	124.6	21 33.4	125.4	20 53.4	126.2	20 13.0	126.9	30
20	24 40.8	125.5	24 00.2	126.3	23 19.3	127.1	22 38.1	127.9	21 56.8	128.6	20
10	26 26.5	127.3	25 44.7	128.1	25 02.7	128.9	24 20.3	129.7	23 37.7	130.4	10
3 00	28 09.4	129.2	27 26.5	130.0	26 43.4	130.8	26 00.0	131.6	25 16.4	132.3	3 00
2 50	29 49.6	131.2	29 05.6	132.0	28 21.1	132.8	27 36.7	133.5	26 51.8	134.2	2 50
40	31 26.7	133.3	30 41.5	134.1	29 56.0	134.8	29 10.1	135.6	28 24.2	136.3	40
30	33 00.5	135.5	32 14.0	136.2	31 27.2	137.0	30 40.4	137.7	29 53.0	138.4	30
20	34 30.6	137.8	33 42.9	138.5	32 55.0	139.2	32 06.7	139.9	31 18.3	140.6	20
10	35 56.8	140.1	35 07.8	140.8	34 18.6	141.5	33 29.2	142.2	32 39.5	142.9	10
2 00	37 18.8	142.6	36 28.5	143.3	35 38.1	144.0	34 47.4	144.6	33 56.5	145.3	2 00
1 50	38 36.0	145.2	37 44.5	145.9	36 52.9	146.5	36 01.0	147.1	35 08.9	147.7	1 50
40	39 48.4	147.9	38 55.7	148.5	38 02.8	149.1	37 09.6	149.7	36 16.5	150.3	40
30	40 55.3	150.7	40 01.4	151.3	39 07.4	151.8	38 13.2	152.4	37 18.9	153.0	30
20	41 56.6	153.6	41 01.6	154.2	40 06.4	154.7	39 11.1	155.2	38 15.8	155.7	20
10	42 51.8	156.6	41 55.7	157.1	40 59.5	157.6	40 03.1	158.1	39 06.8	158.5	10
1 00	43 40.4	159.8	42 43.5	160.2	41 46.3	160.6	40 49.0	161.0	39 51.9	161.4	1 00
0 50	44 22.3	163.0	43 24.3	163.4	42 26.5	163.7	41 28.4	164.1	40 30.4	164.4	0 50
40	44 57.1	166.3	43 58.5	166.6	42 59.8	166.9	42 01.1	167.2	41 02.3	167.4	40
30	45 24.4	169.7	44 25.1	169.9	43 26.0	170.1	42 26.7	170.3	41 27.5	170.5	30
20	45 44.1	173.1	44 44.5	173.2	43 44.9	173.4	42 45.2	173.5	41 45.5	173.7	20
10	45 56.0	176.5	44 56.1	176.6	43 56.2	176.7	42 56.3	176.8	41 56.4	176.8	10
0 00	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 41.6	113.4	0 10.2	114.3							5 10
5 00	2 41.3	114.7	2 09.3	115.5	1 37.2	116.4	1 05.1	117.2	0 33.1	118.1	5 00
4 50	4 39.9	116.0	4 07.1	116.8	3 34.1	117.6	3 01.1	118.5	2 28.2	119.3	4 50
40	6 37.2	117.3	6 03.4	118.1	5 29.6	118.9	4 55.7	119.8	4 21.8	120.6	40
30	8 33.1	118.6	7 58.4	119.4	7 23.7	120.2	6 48.8	121.1	6 14.0	121.9	30
20	10 27.6	120.0	9 51.9	120.8	9 16.2	121.6	8 40.4	122.4	8 04.6	123.2	20
10	12 20.3	121.4	11 43.7	122.3	11 07.1	123.1	10 30.2	123.9	9 53.4	124.6	10
4 00	14 11.4	122.9	13 33.8	123.7	12 56.1	124.5	12 18.3	125.3	11 40.4	126.1	4 00
3 50	16 00.5	124.5	15 21.9	125.3	14 43.2	126.0	14 04.3	126.8	13 25.3	127.6	3 50
40	17 47.6	126.0	17 08.0	126.8	16 28.2	127.6	15 48.2	128.4	15 08.2	129.2	40
30	19 32.5	127.7	18 51.8	128.5	18 10.8	129.3	17 30.0	130.0	16 48.7	130.8	30
20	21 15.2	129.4	20 33.3	130.2	19 51.3	131.0	19 09.1	131.7	18 26.7	132.5	20
10	22 55.2	131.2	22 12.2	132.0	21 29.1	132.7	20 45.7	133.4	20 02.2	134.2	10
3 00	24 32.5	133.1	23 48.3	133.8	23 04.0	134.6	22 19.5	135.3	21 34.8	136.0	3 00
2 50	26 06.7	135.0	25 21.4	135.7	24 35.9	136.5	23 50.2	137.2	23 04.3	137.9	2 50
40	27 37.9	137.0	26 51.3	137.7	26 04.7	138.4	25 17.8	139.1	24 30.8	139.8	40
30	29 05.6	139.1	28 17.8	139.8	27 30.0	140.5	26 41.8	141.2	25 53.6	141.8	30
20	30 29.6	141.3	29 40.6	142.0	28. 51.6	142.6	28 02 2	143.3	27 12.9	143.9	20
10	31 49.6	143.6	30 59.4	144.2	30 09.2	144.8	29 18.7	145.5	28 28.1	146.1	10
2 00	33 05.5	145.9	32 14.1	146.5	31 22.7	147.1	30 31.0	147.7	29 39.4	148.3	2 00
1 50	34 16.7	148.3	33 24.2	148.9	32 31.6	149.5	31 38.9	150.1	30 46.0	150.6	1 50
40	35 23.2	150.8	34 29.5	151.4	33 35.8	151.9	32 41.9	152.5	31 48.1	153.0	40
30	36 24.3	153.5	35 29.7	154.0	34 34.9	154.5	33 40.1	155.0	32 45.0	155.5	30
20	37 20.2	156.2	36 24.6	156.6	35 28.7	157.1	34 32.9	157.5	33 37.0	158.0	20
10	38 10.3	158.9	37 13.7	159.3	36 17.1	159.8	35 20.2	160.2	34 23.5	160.6	10
1 00	38 54.5	161.8	37 56.9	162.1	36 59.4	162.5	36 01.9	162.9	35 04.3	163.2	1 00
0 50	39 32.2	164.7	38 34.0	165.0	37 35.8	165.3	36 37.5	165.6	35 39.2	165.9	0 50
40	40 03.6	167.7	39 04.6	168.0	38 05.8	168.2	37 07.0	168.4	36 08.1	168.7	40
30	40 28.1	170.7	39 28.7	170.9	38 29.4	171.1	37 30.1	171.3	36 30.7	171.5	30
20	40 45.8	173.8	39 46.0	173.9	38 46.3	174.1	37 46.6	174.2	36 47.0	174.3	20
10	40 56.5	176.9	39 56.5	176.9	38 56.6	177.0	37 56.7	177.1	36 56.8	177.2	10
0 00	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 30.0	89.1	1 00.0	88.3	1 30.0	87.4	1 59.9	86.5	6 00
5 50	2 09.9	91.2	2 39.9	90.3	3 09.8	89.5	3 39.8	88.6	4 09.8	87.7	5 50
40	4 19.6	92.5	4 49.7	91.6	5 19.7	90.8	5 49.7	89.9	6 19.5	89.0	40
30	6 29.4	93.7	6 59.6	92.9	7 29.6	92.0	7 59.5	91.2	8 29.5	90.3	30
20	8 38.9	95.0	9 09.2	94.2	9 39.4	93.3	10 09.4	92.4	10 39.3	91.5	20
10	10 48.2	96.3	11 18.7	95.5	11 48.9	94.6	12 19.2	93.7	12 49.2	92.8	10
5 00	12 57.1	97.6	13 27.8	96.8	13 58.3	95.9	14 28.6	95.0	14 58.7	94.1	5 00
4 50	15 05.7	98.9	15 36.6	98.1	16 07.4	97.2	16 38.0	96.3	17 08.2	95.4	4 50
40	17 13.8	100.3	17 45.1	99.4	18 16.1	98.5	18 46.9	97.6	19 17.4	96.7	40
30	19 21.3	101.7	19 52.9	100.8	20 24.2	99.9	20 55.4	99.0	21 26.2	98.0	30
20	21 28.1	103.1	22 00.2	102.2	22 32.0	101.3	23 03.5	100.4	23 34.6	99.4	20
10	23 34.2	104.6	24 06.8	103.7	24 38.9	102.8	25 10.9	101.9	25 42.4	100.9	10
4 00	25 39.6	106.1	26 12.7	105.2	26 45.4	104.3	27 17.7	103.3	27 49.7	102.3	4 00
3 50	27 43.8	107.7	28 17.6	106.7	28 50.8	105.8	29 23.8	104.8	29 56.2	103.8	3 50
40	29 47.1	109.3	30 21.4	108.3	30 55.4	107.4	31 28.9	106.4	32 01.9	105.4	40
30	31 48.9	111.0	32 24.2	110.0	32 58.7	109.1	33 32.9	108.1	34 06.7	107.1	30
20	33 49.6	112.8	34 24.5	111.8	35 00.9	110.8	35 35.8	109.8	36 10.2	108.8	20
10	35 48.5	114.7	36 25.2	113.7	37 01.5	112.7	37 37.2	111.6	38 12.6	110.6	10
3 00	37 45.6	116.6	38 23.3	115.6	39 00.5	114.6	39 37.2	113.6	40 13.3	112.5	3 00
2 50	39 40.8	118.6	40 19.5	117.6	40 57.8	116.6	41 35.3	115.6	42 12.6	114.5	2 50
40	41 33.6	120.8	42 13.2	119.8	42 54.7	118.8	43 31.5	117.7	44 09.6	116.7	40
30	43 23.8	123.1	44 04.9	122.1	44 45.3	121.1	45 25.3	120.0	46 04.7	118.9	30
20	45 11.2	125.5	45 53.5	124.5	46 35.2	123.5	47 16.4	122.4	47 56.9	121.3	20
10	46 55.2	128.1	47 38.6	127.1	48 21.9	126.1	49 04.5	125.0	49 46.4	123.9	10
2 00	48 35.4	130.9	49 20.5	129.9	50 05.1	128.9	50 49.0	127.8	51 32.4	126.7	2 00
1 50	50 11.4	133.9	50 58.0	132.9	51 44.0	131.8	52 29.6	130.7	53 14.6	129.7	1 50
40	51 42.6	137.0	52 30.7	136.0	53 18.4	135.0	54 05.6	134.0	54 52.1	132.9	40
30	53 08.3	140.4	54 58.2	139.4	54 47.5	138.4	55 36.4	137.4	56 24.8	136.4	30
20	54 28.1	143.9	55 19.5	143.0	56 10.5	142.1	57 01.1	141.1	57 51.1	140.1	20
10	55 40.9	147.8	56 34.1	146.9	57 26.8	146.1	58 19.0	145.1	59 10.9	144.2	10
1 00	56 46.5	151.8	57 41.1	151.0	58 35.4	150.2	59 29.4	149.4	60 23.0	148.5	1 00
0 50	57 43.5	156.1	58 39.6	155.4	59 35.4	154.7	60 31.0	154.0	61 26.4	153.2	0 50
40	58 31.5	160.6	59 28.9	160.0	60 26.2	159.4	61 23.3	158.8	62 20.1	158.1	40
30	59 09.7	165.3	60 08.2	164.7	61 06.5	164.3	62 04.8	163.8	63 03.1	163.3	30
20	59 37.5	170.1	60 36.9	169.7	61 36.0	169.4	62 35.3	169.1	63 34.4	168.7	20
10	59 54.3	175.0	60 54.2	174.8	61 54.0	174.7	62 53.8	174.5	63 53.6	174.3	10
0 00	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 12.6	79.7	6 20
10	0 20.5	84.4	0 50.6	83.6	1 20.6	82.7	1 50.7	81.8	2 20.6	80.9	10
6 00	2 29.8	85.7	2 59.7	84.8	3 29.6	83.9	3 59.4	83.1	4 29.2	82.2	6 00
5 50	4 39.5	86.9	5 09.2	86.0	5 38.9	85.1	6 08.5	84.3	6 38.0	83.4	5 50
40	6 49.3	88.1	7 18.9	87.3	7 48.5	86.4	8 17.9	85.5	8 47.2	84.6	40
30	8 59.1	89.3	9 28.8	88.5	9 58.3	87.6	10 27.5	86.7	10 56.7	85.8	30
20	11 09.0	90.6	11 38.6	89.8	12 08.1	88.9	12 37.3	88.0	13 06.4	87.1	20
10	13 18.9	91.9	13 48.5	91.0	14 17.9	90.1	14 47.2	89.2	15 16.1	88.3	10
5 00	15 28.6	93.2	15 58.3	92.3	16 27.8	91.4	16 57.0	90.5	17 26.0	89.5	5 00
4 50	17 38.2	94.5	18 08.1	93.6	18 37.6	92.6	19 06.9	91.7	19 35.9	90.8	4 50
40	19 47.7	95.8	20 17.6	94.9	20 47.3	93.9	21 16.7	93.0	21 45.8	92.1	40
30	21 56.8	97.1	22 26.9	96.2	22 56.8	95.2	23 26.3	94.3	23 55.5	93.4	30
20	24 05.4	98.5	24 35.9	97.6	25 06.0	96.6	25 35.7	95.6	26 05.1	94.7	20
10	26 13.7	99.9	26 44.5	99.0	27 14.8	98.0	27 44.8	97.0	28 14.5	96.0	10
4 00	28 21.3	101.4	28 52.5	100.4	29 23.3	99.4	29 53.6	98.4	30 23.5	97.4	4 00
3 50	30 28.2	102.9	30 59.9	101.9	31 31.2	100.9	32 01.8	99.9	32 32.1	98.9	3 50
40	32 34.5	104.4	33 06.7	103.4	33 38.4	102.4	34 09.6	101.4	34 40.2	100.4	40
30	34 39.9	106.1	35 12.6	105.0	35 44.8	104.0	36 16.4	103.0	36 47.6	101.9	30
20	36 44.1	107.8	37 17.5	106.7	37 50.4	105.7	38 22.6	104.6	38 54.3	103.5	20
10	38 47.2	109.5	39 21.4	108.5	39 54.9	107.4	40 27.9	106.3	41 00.2	105.2	10
3 00	40 48.8	111.4	41 23.8	110.4	41 58.2	109.3	42 31.9	108.2	43 04.9	107.0	3 00
2 50	42 48.9	113.4	43 24.8	112.4	44 00.0	111.2	44 34.6	110.1	45 08.5	108.9	2 50
40	44 47.1	115.5	45 24.0	114.4	46 00.3	113.3	46 35.8	112.1	47 10.6	110.9	40
30	46 43.2	117.8	47 21.2	116.7	47 58.6	115.5	48 35.2	114.3	49 11.1	113.1	30
20	48 36.8	120.2	49 16.1	119.1	49 54.7	117.9	50 32.5	116.7	51 09.5	115.4	20
10	50 27.5	122.7	51 08.2	121.6	51 48.1	120.4	52 27.3	119.2	53 05.7	117.9	10
2 00	52 15.1	125.5	52 57.2	124.4	53 38.6	123.1	54 19.2	121.9	54 58.9	120.6	2 00
1 50	53 58.9	128.5	54 42.5	127.4	55 25.5	126.1	56 07.6	124.9	56 49.1	123.5	1 50
40	55 38.1	131.8	56 23.5	130.6	57 08.2	129.4	57 52.1	128.1	58 35.2	126.8	40
30	57 12.5	135.3	57 59.5	134.1	58 46.0	132.9	59 31.9	131.6	60 17.0	130.3	30
20	58 40.7	139.0	59 29.8	137.9	60 18.3	136.8	61 06.0	135.5	61 53.0	134.2	20
10	60 02.2	143.1	60 53.4	142.1	61 43.7	141.0	62 33.7	139.8	63 22.8	138.5	10
1 00	61 16.2	147.6	62 09.1	146.6	63 01.6	145.5	63 53.5	144.4	64 44.7	143.2	1 00
0 50	62 21.2	152.3	63 16.1	151.4	64 10.4	150.4	65 04.5	149.4	65 58.0	148.3	0 50
40	63 16.7	157.4	64 13.1	156.6	65 09.3	155.8	66 05.1	154.9	67 00.6	153.9	40
30	64 01.0	162.7	64 59.0	162.1	65 56.7	161.5	66 54.2	160.8	67 51.6	160.0	30
20	64 33.6	168.3	65 32.6	167.9	66 31.6	167.5	67 30.4	167.0	68 29.2	166.4	20
10	64 53.3	174.1	65 53.1	173.9	66 52.8	173.7	67 52.5	173.4	68 52.2	173.1	10
0 00	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 08.1	75.1	0 38.8	74.2	6 30
20	0 42.9	78.8	1 13.3	78.0	1 43.6	77.1	2 13.9	76.3	2 44.1	75.4	20
10	2 50.7	80.1	3 20.6	79.2	3 50.6	78.3	4 20.4	77.5	4 50.4	76.6	10
6 00	4 58.9	81.3	5 28.5	80.4	5 58.0	79.6	6 27.5	78.7	6 56.8	77.8	6 00
5 50	7 07.5	82.5	7 36.9	81.6	8 06.1	80.8	8 35.1	79.9	9 04.1	79.0	5 50
40	9 16.4	83.7	9 45.5	82.8	10 14.4	82.0	10 43.2	81.1	11 11.9	80.2	40
30	11 25.8	84.9	11 54.6	84.0	12 23.3	83.2	12 51.7	82.3	13 20.1	81.4	30
20	13 35.3	86.2	14 03.9	85.3	14 32.4	84.4	15 00.7	83.4	15 28.8	82.5	20
10	15 45.0	87.4	16 13.5	86.5	16 41.9	85.6	17 09.9	84.6	17 37.7	83.7	10
5 00	17 54.7	88.6	18 23.2	87.7	18 51.4	86.8	19 19.3	85.8	19 46.9	84.9	5 00
4 50	20 04.7	89.8	20 33.1	88.9	21 01.2	88.0	21 29.0	87.0	21 56.5	86.1	4 50
40	22 14.5	91.1	22 42.9	90.2	23 11.0	89.2	23 38.8	88.2	24 06.1	87.3	40
30	24 24.5	92.4	24 52.8	91.4	25 21.0	90.4	25 48.7	89.4	26 15.9	88.5	30
20	26 34.1	93.7	27 02.7	92.7	27 30.8	91.7	27 58.5	90.7	28 25.9	89.7	20
10	28 42.7	95.0	29 12.3	94.0	29 40.6	93.0	30 08.4	92.0	30 35.7	91.0	10
4 00	30 52.9	96.4	31 21.8	95.4	31 50.2	94.3	32 18.1	93.3	32 45.6	92.3	4 00
3 50	33 01.8	97.8	33 30.9	96.8	33 59.6	95.7	34 27.8	94.7	34 55.4	93.6	3 50
40	35 10.3	99.3	35 39.8	98.2	36 08.7	97.1	36 37.1	96.1	37 04.9	94.9	40
30	37 18.3	100.8	37 48.1	99.7	38 17.2	98.6	38 46.0	97.5	39 14.1	96.3	30
20	39 25.4	102.4	39 55.8	101.3	40 25.6	100.2	40 54.7	99.0	41 23.1	97.8	20
10	41 31.8	104.1	42 02.8	103.0	42 33.1	101.8	43 02.7	100.6	43 31.4	99.4	10
3 00	43 37.3	105.9	44 09.0	104.7	44 39.8	103.5	45 09.9	102.3	45 39.3	101.0	3 00
2 50	45 41.7	107.7	46 14.0	106.5	46 45.7	105.3	47 16.4	104.0	47 46.4	102.7	2 50
40	47 44.7	109.7	48 18.0	108.5	48 50.4	107.2	49 22.0	105.9	49 52.7	104.6	40
30	49 46.2	111.8	50 20.5	110.6	50 53.8	109.3	51 26.2	107.9	51 57.8	106.6	30
20	51 45.8	114.1	52 21.2	112.8	52 55.6	111.5	53 29.1	110.1	54 01.7	108.7	20
10	53 43.2	116.6	54 19.7	115.3	54 55.5	113.9	55 30.2	112.5	56 03.9	111.0	10
2 00	55 38.0	119.3	56 16.1	117.9	56 53.1	116.5	57 29.1	115.0	58 04.3	113.5	2 00
1 50	57 29.6	122.2	58 09.2	120.8	58 47.9	119.3	59 25.5	117.8	60 02.0	116.2	1 50
40	59 17.6	125.4	59 59.0	124.0	60 39.4	122.5	61 18.7	120.9	61 57.1	119.3	40
30	61 01.1	128.9	61 44.4	127.5	62 26.7	126.0	63 08.0	124.4	63 48.2	122.7	30
20	62 39.3	132.8	63 24.9	131.4	64 09.3	129.9	64 52.7	128.3	65 35.3	126.6	20
10	64 11.4	137.2	64 59.0	135.7	65 45.7	134.2	66 31.5	132.6	67 16.7	131.0	10
1 00	65 35.6	141.9	66 25.7	140.6	67 15.0	139.1	68 03.3	137.5	68 50.9	135.9	1 00
0 50	66 51.0	147.2	67 43.4	145.9	68 35.4	144.6	69 26.5	143.1	70 16.8	141.5	0 50
40	67 55.9	152.9	68 50.8	151.8	69 45.1	150.6	70 38.8	149.3	71 32.1	147.9	40
30	68 48.8	159.2	69 45.5	158.3	70 42.2	157.3	71 38.2	156.2	72 34.0	155.0	30
20	69 28.0	165.8	70 26.5	165.2	71 24.8	164.5	72 23.1	163.7	73 21.3	162.8	20
10	69 51.9	172.8	70 51.5	172.5	71 51.1	172.1	72 50.6	171.7	73 50.1	171.3	10
0 00	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40					0 08. 1	70. 4	0 39. 5	69. 5	1 10. 8	68. 6	6 40
30	1 09. 5	73. 3	1 40. 3	72. 5	2 10. 9	71. 6	2 41. 7	70. 7	3 12. 2	69. 9	30
20	3 14. 3	74. 5	3 44. 4	73. 7	4 14. 6	72. 8	4 44. 7	71. 9	5 14. 7	71. 1	20
10	5 20. 0	75 7	5 39. 6	74. 9	6 19. 1	74. 0	6 48. 7	73. 1	7 18. 0	72. 3	10
6 00	7 26. 1	76. 9	7 55. 3	76. 1	8 24. 3	75. 2	8 53. 3	74. 3	9 22. 1	73. 4	6 00
5 50	9 33. 0	78. 1	10 01. 8	77. 2	10 30. 2	76. 3	10 58. 7	75. 4	11 26. 9	74. 5	5 50
40	11 40. 5	79. 3	12 08. 8	78. 4	12 36. 9	77. 5	13 04. 8	76. 6	13 32. 5	75. 6	40
30	13 48. 2	80. 4	14 16. 1	79. 5	14 43. 8	78. 6	15 11. 4	77. 7	15 38. 6	76. 8	30
20	15 56. 6	81. 6	16 24. 2	80. 7	16 51. 5	79. 8	17 18. 6	78. 8	17 45. 4	77. 9	20
10	18 05. 2	82. 7	18 32. 6	81. 8	18 59. 5	80. 9	19 26. 2	80. 0	19 52. 7	79. 0	10
5 00	20 14. 3	83. 9	20 41. 3	83. 0	21 08. 0	82. 0	21 34. 4	81. 1	22 00. 4	80. 1	5 00
4 50	22 23. 6	85. 1	22 50. 3	84. 1	23 16. 8	83. 1	23 42. 8	82. 2	24 08. 5	81. 2	4 50
40	24 33. 2	86. 3	24 59. 8	85. 3	25 26. 0	84. 3	25 51. 8	83. 3	26 17. 1	82. 3	40
30	26 42. 8	87. 5	27 09. 2	86. 5	27 35. 2	85. 5	28 00. 9	84. 4	28 26. 0	83. 4	30
20	28 52. 7	88. 7	29 19. 1	87. 7	29 44. 9	86. 6	30 10. 3	85. 6	30 35. 2	84. 5	20
10	31 02. 5	89. 9	31 28. 9	88. 9	31 54. 6	87. 8	32 19. 8	86. 8	32 44. 6	85. 7	10
4 00	33 12. 5	91. 2	33 38. 8	90. 1	34 04. 5	89. 0	34 29. 7	87. 9	34 54. 3	86. 8	4 00
3 50	35 22. 2	92. 5	35 48. 6	91. 4	36 14. 2	90. 3	36 39. 4	89. 1	37 04. 0	88. 0	3 50
40	37 32. 0	93. 8	37 58. 5	92. 7	38 24. 3	91. 6	38 49. 4	90. 4	39 13. 9	89. 2	40
30	39 41. 4	95. 2	40 08. 1	94. 0	40 34. 0	92. 9	40 59. 2	91. 7	41 23. 7	90. 4	30
20	41 50. 8	96. 6	42 17. 7	95. 4	42 43. 8	94. 2	43 09. 2	93. 0	43 33. 7	91. 7	20
10	43 59. 5	98. 1	44 26. 8	96. 9	44 53. 1	95. 7	45 18. 8	94. 4	45 44. 4	93. 1	10
3 00	46 07. 9	99. 7	46 35. 6	98. 5	47 02. 3	97. 2	47 28. 2	95. 8	47 53. 1	94. 5	3 00
2 50	48 15. 4	101. 4	48 43. 8	100. 1	49 10. 8	98. 7	49 37. 1	97. 4	50 02. 3	96. 0	2 50
40	50 22. 6	103. 2	50 51. 4	101. 9	51 19. 1	100. 4	51 45. 9	99. 0	52 11. 5	97. 5	40
30	52 28. 4	105. 1	52 58. 0	103. 7	53 26. 3	102. 2	53 53. 7	100. 7	54 19. 9	99. 2	30
20	54 33. 3	107. 2	55 03. 7	105. 7	55 32. 9	104. 2	56 01. 0	102. 6	56 28. 0	101. 0	20
10	56 36. 5	109. 4	57 08. 1	107. 9	57 38. 1	106. 3	58 07. 2	104. 6	58 34. 9	102. 9	10
2 00	58 38. 2	111. 9	59 10. 9	110. 3	59 42. 2	108. 6	60 12. 3	106. 9	60 41. 1	105. 1	2 00
1 50	60 37. 2	114. 6	61 11. 5	112. 9	61 44. 2	111. 2	62 15. 7	109. 4	62 45. 6	107. 5	1 50
40	62 34. 0	117. 6	63 10. 1	115. 9	63 44. 3	114. 0	64 17. 3	112. 1	64 48. 8	110. 1	40
30	64 27. 2	121. 0	65 05. 0	119. 2	65 41. 2	117. 3	66 16. 1	115. 3	66 49. 2	113. 2	30
20	66 16. 7	124. 8	66 56. 5	122. 9	67 34. 9	121. 0	68 12. 0	118. 9	68 47. 5	116. 6	20
10	68 00. 1	129. 1	68 42. 6	127. 2	69 23. 8	125. 2	70 03. 2	123. 0	70 41. 2	120. 7	10
1 00	69 37. 6	134. 1	70 22. 8	132. 2	71 06. 6	130. 1	71 49. 3	127. 9	72 30. 4	125. 5	1 00
0 50	71 06. 2	139. 8	71 54. 5	137. 9	72 41. 5	135. 9	73 27. 5	133. 7	74 12. 0	131. 3	0 50
40	72 24. 7	146. 3	73 16. 2	144. 6	74 06. 6	142. 7	74 56. 2	140. 5	75 44. 7	138. 2	40
30	73 29. 2	153. 7	74 24. 2	152. 2	75 18. 4	150. 5	76 11. 2	148. 7	77 03. 7	146. 5	30
20	74 19. 1	161. 9	75 16. 4	160. 8	76 13. 4	159. 5	77 10. 0	158. 1	78 06. 3	156. 5	20
10	74 49. 5	170. 7	75 48. 8	170. 2	76 48. 0	169. 5	77 47. 2	168. 7	78 46. 1	167. 8	10
0 00	75 0. 0	180. 0	76 0. 0	180. 0	77 0. 0	180. 0	78 0. 0	180. 0	79 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50			0 14.4	65.7	0 46.4	64.9	1 18.4	64.0	1 50.4	63.2	6 50
40	1 42.1	67.8	2 13.4	66.9	2 44.5	66.1	3 15.8	65.2	3 47.0	64.4	40
30	3 42.8	69.0	4 13.4	68.1	4 43.8	67.3	5 14.3	66.4	5 44.7	65.5	30
20	5 44.6	70.2	6 14.5	69.3	6 44.3	68.5	7 14.0	67.6	7 43.5	66.7	20
10	7 47.2	71.4	8 16.5	70.5	8 45.6	69.6	9 14.4	68.7	9 43.3	67.8	10
6 00	9 50.8	72.5	10 19.3	71.6	10 47.7	70.7	11 15.9	69.8	11 44.0	68.9	6 00
5 50	11 55.1	73.6	12 23.0	72.7	12 50.7	71.8	13 18.2	70.9	13 45.7	70.0	5 50
40	14 00.0	74.7	14 27.3	73.8	14 54.5	72.9	15 21.4	72.0	15 48.1	71.1	40
30	16 05.7	75.8	16 32.4	74.9	16 59.0	74.0	17 25.3	73.1	17 51.3	72.1	30
20	18 12.0	76.9	18 38.3	76.0	19 04.3	75.1	19 30.0	74.1	19 55.4	73.1	20
10	20 18.7	78.0	20 44.6	77.1	21 10.0	76.1	21 35.2	75.1	22 00.0	74.1	10
5 00	22 26.1	79.1	22 51.4	78.1	23 16.4	77.2	23 41.1	76.2	24 05.3	75 2	5 00
4 50	24 33.8	80.2	24 58.8	79.2	25 23.2	78.2	25 47.3	77.2	26 11.2	76.2	4 50
40	26 42.1	81.3	27 06.6	80.2	27 30.7	79.2	27 54.3	78.2	28 17.5	77.1	40
30	28 50.6	82.4	29 14.8	81.3	29 38.4	80.3	30 01.7	79.2	30 24.3	78.1	30
20	30 59.6	83.5	31 23.4	82.4	31 46.8	81.3	32 09.5	80.2	32 31.7	79.1	20
10	33 08.7	84.6	33 32.2	83 5.	33 55.2	82.3	34 17.7	81.2	34 39.5	80.1	10
4 00	35 18.2	85.7	35 41.5	84.6	36 04.3	83.4	36 26.3	82.3	36 47.7	81.1	4 00
3 50	37 27.7	86.8	37 51.0	85.7	38 13.4	84.5	38 35.1	83.3	38 56.2	82.1	3 50
40	39 37.6	88.0	40 00.5	86.8	40 22.8	85.6	40 44.3	84.4	41 04.9	83.1	40
30	41 47.4	89.2	42 10.3	88.0	42 32.5	86.7	42 53.7	85.5	43 14.0	84.2	30
20	43 57.4	90.5	44 20.2	89.2	44 42.2	87.9	45 03.4	86.5	45 23.5	85.2	20
10	46 07.2	91.7	46 30.1	90.4	46 52.0	89.1	47 13.1	87.7	47 33.0	86 3	10
3 00	48 17.0	93.1	48 39.9	91.7	49 01.9	90.3	49 22.8	88.9	49 42.6	87.4	3 00
2 50	50 26.7	94.5	50 49.7	93.1	51. 11.7	91.6	51 32.7	90.1	51 52.6	88.6	2 50
40	52 36.0	96.0	52 59.3	94.5	53 21.5	93.0	53 42.6	91.4	54 02.3	89.8	40
30	54 45.0	97.6	55 08.7	96.0	55 31.1	94.4	55 52.4	92.7	56 12.2	91.1	30
20	56 53.5	99.4	57 17.7	97.7	57 40.6	96.0	58 02.1	94.2	58 22.0	92.4	20
10	59 01.2	101.2	59 26.1	99.4	59 49.5	97.6	60 11.2	95.8	60 31.9	93.9	10
2 00	61 08.2	103.3	61 33.8	101.4	61 58.1	99.4	62 20.7	97.5	62 41.3	95.4	2 00
1 50	63 14.1	105.5	63 40.7	103.5	64 05.7	101.5	64 29.1	99.4	64 50.3	97.2	1 50
40	65 18.4	108.1	65 46.3	105.9	66 12.5	103.7	66 36.9	101.4	66 58.9	99.1	40
30	67 20.8	111.0	67 50.5	108.7	68 18.0	106.3	68 43.6	103.9	69 07.0	101.3	30
20	69 20.9	114.3	69 59.2	111.9	70 21.9	109.3	70 49.2	106.6	71 13.7	103.9	20
10	71 17.2	118.2	71 51.2	115.7	72 22.7	112.9	72 52.2	110.0	73 19.0	106.9	10
1 00	73 09.2	123.0	73 45.9	120.2	74 20.8	117.2	74 53.0	114.0	75 22.0	110.6	1 00
0 50	74 54.2	128.6	75 35.0	125.7	76 13.2	122.6	76 48.7	119.1	77 21.5	115.4	0 50
40	76 31.0	135.6	77 15.4	132.7	77 58.6	129.4	78 39.2	125.7	79 15.9	121.6	40
30	77 55.0	144.1	78 44.5	141.4	79 32.7	138.1	80 18.5	134.5	81 01.5	130.2	30
20	79 01.5	154.5	79 55.8	152.2	80 49.4	149.5	81 41.7	146.3	82 31.5	142.2	20
10	79 44.8	166.7	80 43.4	165.4	81 41.5	163.8	82 39.1	161.7	83 36.0	159.0	10
0 00	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	84 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 09.9	91.2	1 39.8	92.1	1 09.8	93.0	0 39.8	93.9	0 09.7	94.7	5 50
40	4 19.6	92.5	3 49.5	93.4	3 19.6	94.2	2 49.2	95.1	2 19.0	96.0	40
30	6 29.4	93.7	5 59.1	94.6	5 28.8	95.5	4 58.6	96.3	4 28.1	97.2	30
20	8 38.9	95.0	8 08.5	95.9	7 38.0	96.8	7 07.4	97.6	6 36.7	98.5	20
10	10 48.2	96.3	10 17.6	97.2	9 46.8	98.1	9 16.1	98.9	8 45.0	99.8	10
5 00	12 57.1	97.6	12 26.3	98.5	11 55.2	99.4	11 24.0	100.2	10 52.7	101.1	5 00
4 50	15 05.7	98.9	14 34.6	99.8	14 03.1	100.7	13 31.7	101.5	12 59.8	102.4	4 50
40	17 13.8	100.3	16 42.3	101.2	16 10.5	102.1	15 38.6	102.9	15 06.4	103.8	40
30	19 21.3	101.7	18 49.2	102.6	18 17.1	103.5	17 44.8	104.4	17 12.2	105.3	30
20	21 28.1	103.1	20 55.8	104.0	20 23.1	104.9	19 50.2	105.8	19 17.0	106.7	20
10	23 34.2	104.6	23 01.3	105.5	22 28.1	106.4	21 54.8	107.3	21 20.8	108.2	10
4 00	25 39.6	106.1	25 06.1	107.0	24 32.3	107.9	23 58.2	108.8	23 23.7	109.7	4 00
3 50	27 43.8	107.7	27 09.8	108.6	26 35.2	109.5	26 00.6	110.4	25 25.4	111.3	3 50
40	29 47.1	109.3	29 12.3	110.2	28 37.2	111.2	28 01.6	112.1	27 25.7	113.0	40
30	31 48.9	111.0	31 13.5	111.9	30 37.5	112.9	30 01.2	113.8	29 24.5	114.7	30
20	33 49.6	112.8	33 13.3	113.7	32 36.5	114.7	31 59.3	115.6	31 21.7	116.5	20
10	35 48.5	114.7	35 11.2	115.6	34 33.6	116.5	33 55.6	117.4	33 17.0	118.4	10
3 00	37 45.6	116.6	37 07.5	117.5	36 28.8	118.5	35 49.7	119.4	35 10.2	120.4	3 00
2 50	39 40.8	118.6	39 01.5	119.6	38 21.8	120.6	37 41.8	121.5	37 01.2	122.4	2 50
40	41 33.6	120.8	40 53.3	121.8	40 12.4	122.7	39 31.1	123.7	38 49.3	124.6	40
30	43 23.8	123.1	42 42.2	124.1	42 00.2	125.0	41 17.9	126.0	40 34.8	126.9	30
20	45 11.2	125.5	44 28.4	126.5	43 45.1	127.5	43 01.2	128.4	42 17.0	129.3	20
10	46 55.2	128.1	46 10.9	129.1	45 26.3	130.1	44 41.2	131.0	43 55.6	131.9	10
2 00	48 35.4	130.9	47 49.8	131.9	47 03.7	132.8	46 17.2	133.7	45 30.2	134.6	2 00
1 50	50 11.4	133.9	49 24.2	134.8	48 36.7	135.7	47 48.8	136.6	47 00.3	137.5	1 50
40	51 42.6	137.0	50 54.0	137.9	50 04.9	138.8	49 15.4	139.7	48 25.5	140.5	40
30	53 08.3	140.4	52 18.2	141.3	51 27.5	142.1	50 36.7	143.0	49 45.2	143.8	30
20	54 28.1	143.9	53 36.3	144.8	52 44.2	145.6	51 51.7	146.4	50 58.9	147.2	20
10	55 40.9	147.8	54 47.6	148.6	53 54.0	149.3	53 00.0	150.1	52 05.8	150.8	10
1 00	56 46.5	151.8	55 51.6	152.5	54 56.5	153.2	54 01.1	153.9	53 05.5	154.5	1 00
0 50	57 43.5	156.1	56 47.2	156.7	55 50.8	157.3	54 54.2	157.9	53 57.4	158.5	0 50
40	58 31.5	160.6	57 34.0	161.1	56 36.3	161.6	55 38.6	162.1	54 40.7	162.6	40
30	59 09.7	165.3	58 11.1	165.7	57 12.5	166.1	56 13.9	166.5	55 15.1	166.8	30
20	59 37.5	170.1	58 38.2	170.4	57 38.8	170.7	56 39.4	170.9	55 39.9	171.2	20
10	59 54.3	175.0	58 54.5	175.2	57 54.7	175.3	56 54.8	175.4	55 55.0	175.6	10
0 00	60 0.0	180.0	59 0.0	180.0	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 48.7	96.8	1 18.4	97.7	0 48.1	98.6	0 17.8	99.4			5 40
30	3 57.5	98.1	3 26.9	99.0	2 56.4	99.9	2 25.7	100.7	1 54.9	101.5	30
20	6 05.9	99.4	5 35.0	100.2	5 04.0	101.1	4 33.0	102.0	4 01.9	102.8	20
10	8 13.9	100.7	7 42.6	101.6	7 11.3	102.4	6 39.8	103.3	6 08.2	104.1	10
5 00	10 21.2	102.0	9 49.6	102.9	9 17.8	103.7	8 45.9	104.6	8 13.9	105.4	5 00
4 50	12 27.9	103.3	11 55.9	104.2	11 23.6	105.0	10 51.2	105.9	10 18.7	106.7	4 50
40	14 34.0	104.7	14 01.4	105.6	13 28.7	106.4	12 55.7	107.3	12 22.6	108.1	40
30	16 39.2	106.1	16 06.1	107.0	15 32.7	107.8	14 59.2	108.7	14 25.4	109.5	30
20	18 43.5	107.6	18 09.8	108.4	17 35.9	109.3	17 01.7	110.2	16 27.3	111.0	20
10	20 46.9	109.1	20 12.5	109.9	19 37.9	110.8	19 03.1	111.7	18 27.9	112.5	10
4 00	22 49.0	110.6	22 14.0	111.5	21 38.7	112.4	21 03.1	113.2	20 27.3	114.1	4 00
3 50	24 49.9	112.2	24 14.2	113.1	23 38.2	114.0	23 01.8	114.8	22 25.2	115.7	3 50
40	26 49.5	113.9	26 12.9	114.8	25 36.1	115.7	24 58.9	116.5	24 21.4	117.4	40
30	28 47.6	115.6	28 10.1	116.5	27 32.3	117.4	26 54.2	118.2	26 15.8	119.1	30
20	30 43.7	117.4	30 05.4	118.3	29 26.7	119.2	28 47.6	120.0	28 08.3	120.9	20
10	32 38.1	119.3	31 58.8	120.2	31 19.2	121.1	30 39.1	121.9	29 58.7	122.8	10
3 00	34 30.3	121.3	33 49.9	122.2	33 09.2	123.1	32 28.1	123.9	31 46.7	124.8	3 00
2 50	36 20.1	123.3	35 38.6	124.2	34 56.7	125.1	34 14.6	126.0	33 32.0	126.9	2 50
40	38 07.2	125.5	37 24.6	126.4	36 41.6	127.3	35 58.2	128.1	35 14.5	129.0	40
30	39 51.4	127.8	39 07.6	128.7	38 23.5	129.6	37 38.9	130.4	36 53.8	131.2	30
20	41 32.4	130.2	40 47.3	131.1	40 01.8	132.0	39 15.9	132.8	38 29.7	133.6	20
10	43 09.7	132.8	42 23.2	133.7	41 36.5	134.5	40 49.4	135.3	40 01.7	136.1	10
2 00	44 42.9	135.5	43 55.1	136.4	43 07.0	137.2	42 18.5	138.0	41 29.7	138.8	2 00
1 50	46 11.6	138.4	45 22.4	139.2	44 32.9	140.0	43 43.1	140.8	42 53.0	141.5	1 50
40	47 35.3	141.4	46 44.7	142.2	45 53.9	142.9	45 02.7	143.7	44 11.2	144.4	40
30	48 53.7	144.6	48 01.6	145.3	47 09.3	146.0	46 16.9	146.8	45 24.1	147.4	30
20	50 05.8	147.9	49 12.4	148.6	48 18.8	149.3	47 25.0	150.0	46 31.0	150.6	20
10	51 11.4	151.4	50 16.8	152.1	49 21.8	152.7	48 26.8	153.3	47 31.4	153.9	10
1 00	52 09.8	155.1	51 13.8	155.7	50 17.7	156.3	49 21.5	156.8	48 25.1	157.3	1 00
0 50	53 00.4	159.0	52 03.2	159.5	51 06.1	160.0	50 08.9	160.5	49 11.3	160.9	0 50
40	53 42.7	163.0	52 44.6	163.4	51 46.4	163.8	50 48.2	164.2	49 49.9	164.6	40
30	54 16.2	167.2	53 17.4	167.5	52 18.4	167.8	51 19.3	168.1	50 20.2	168.4	30
20	54 40.5	171.4	53 41.0	171.6	52 41.4	171.8	51 41.9	172.0	50 42.3	172.2	20
10	54 55.1	175.7	53 55.2	175.8	52 55.3	175.9	51 55.4	176.0	50 55.5	176.1	10
0 00	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 24.2	102.4	0 53.4	103.2	0 22.7	104.1					5 30
20	3 30.7	103.7	2 59.5	104.5	2 28.3	105.4	1 57.1	106.2	1 25.8	107.1	20
10	5 36.7	105.0	5 04.9	105.8	4 33.3	106.7	4 01.4	107.5	3 29.6	108.4	10
5 00	7 41.8	106.3	7 09.5	107.1	6 37.2	108.0	6 04.8	108.8	5 32.4	109.7	5 00
4 50	9 46.0	107.6	9 13.2	108.4	8 40.3	109.3	8 07.3	110.1	7 34.1	111.0	4 50
40	11 49.3	109.0	11 15.9	109.8	10 42.3	110.7	10 08.7	111.5	9 34.9	112.4	40
30	13 51.6	110.4	13 17.5	111.2	12 43.3	112.1	12 08.9	112.9	11 34.3	113.8	30
20	15 52.7	111.9	15 18.0	112.7	14 43.0	113.6	14 07.9	114.3	13 32.6	115.2	20
10	17 51.7	113.4	17 17.1	114.2	16 41.3	115.1	16 05.5	115.8	15 29.3	116.7	10
4 00	19 51.2	114.9	19 14.9	115.8	18 38.3	116.6	18 01.6	117.5	17 24.6	118.3	4 00
3 50	21 48.2	116.5	21 10.9	117.4	20 33.6	118.2	19 56.0	119.1	19 18.1	119.9	3 50
40	23 43.6	118.2	23 05.5	119.1	22 27.1	119.9	21 48.6	120.7	21 09.8	121.5	40
30	25 37.1	119.9	24 58.0	120.8	24 18.8	121.6	23 39.2	122.4	22 59.4	123.2	30
20	27 28.6	121.7	26 48.6	122.6	26 08.3	123.4	25 27.8	124.2	24 47.0	125.0	20
10	29 17.9	123.6	28 36.9	124.5	27 55.6	125.3	27 14.0	126.1	26 32.1	126.9	10
3 00	31 04.9	125.6	30 22.7	126.4	29 40.3	127.2	28 57.6	128.0	28 14.6	128.8	3 00
2 50	32 49.1	127.7	32 05.7	128.5	31 22.2	129.3	30 38.5	130.1	29 54.4	130.9	2 50
40	34 30.4	129.8	33 46.0	130.6	33 01.3	131.4	32 16.3	132.2	31 31.1	133.0	40
30	36 08.6	132.0	35 23.0	132.9	34 37.0	133.7	33 50.8	134.4	33 04.3	135.1	30
20	37 43.2	134.4	36 56.3	135.2	36 09.2	136.0	35 21.8	136.7	34 34.1	137.5	20
10	39 14.0	136.9	38 25.8	137.7	37 37.5	138.4	36 48.8	139.1	35 59.8	139.9	10
2 00	40 40.6	139.5	39 51.2	140.3	39 01.5	141.0	38 11.6	141.7	37 21.4	142.4	2 00
1 50	42 02.5	142.2	41 11.8	143.0	40 20.8	143.7	39 29.8	144.4	38 38.2	145.0	1 50
40	43 19.5	145.1	42 27.5	145.8	41 35.3	146.5	40 42.9	147.1	39 50.3	147.7	40
30	44 31.0	148.1	43 37.7	148.7	42 44.4	149.4	41 50.8	150.0	40 56.9	150.6	30
20	45 36.7	151.2	44 42.2	151.8	43 47.6	152.4	42 52.8	152.9	41 57.9	153.5	20
10	46 36.0	154.5	45 40.4	155.0	44 44.6	155.5	43 48.8	156.0	42 52.8	156.5	10
1 00	47 28.5	157.8	46 31.9	158.3	45 35.1	158.8	44 38.2	159.3	43 41.2	159.7	1 00
0 50	48 13.8	161.3	47 16.1	161.8	46 18.5	162.2	45 20.5	162.6	44 22.8	162.9	0 50
40	48 51.5	164.9	47 53.1	165.3	46 54.6	165.6	45 56.1	165.9	44 57.5	166.2	40
30	49 21.2	168.6	48 22.0	168.9	47 23.0	169.1	46 23.8	169.4	45 24.6	169.6	30
20	49 42.7	172.4	48 43.1	172.6	47 43.5	172.7	46 43.9	172.9	45 44.3	173.1	20
10	49 55.7	176.2	48 55.8	176.3	47 55.9	176.3	46 56.0	176.4	45 56.0	176.5	10
0 00	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 54.5	107.9	0 23.2	108.8							5 20
10	2 57.6	109.2	2 25.8	110.1	1 53.8	110.9	1 21.8	111.8	0 49.7	112.6	10
5 00	4 59.8	110.5	4 27.2	111.4	3 54.5	112.2	3 21.8	113.1	2 49.0	113.9	5 00
4 50	7 00.9	111.8	6 27.7	112.7	5 54.2	113.5	5 20.8	114.4	4 47.2	115.2	4 50
40	9 00.9	113.2	8 26.9	114.1	7 52.8	114.9	7 18.5	115.7	6 44.1	116.5	40
30	10 59.7	114.6	10 24.8	115.5	9 49.8	116.3	9 14.8	117.1	8 39.6	117.9	30
20	12 57.1	116.1	12 21.5	116.9	11 45.7	117.7	11 09.7	118.5	10 33.6	119.4	20
10	14 52.9	117.6	14 16.5	118.4	13 39.8	119.2	13 03.0	120.0	12 26.1	120.8	10
4 00	16 47.4	119.1	16 10.0	119.9	15 32.4	120.7	14 54.6	121.5	14 16.7	122.3	4 00
3 50	18 39.9	120.7	18 01.6	121.5	17 23.1	122.3	16 44.4	123.1	16 05.5	123.9	3 50
40	20 30.8	122.3	19 51.5	123.2	19 12.0	124.0	18 32.3	124.7	17 52.3	125.5	40
30	22 19.4	124.0	21 39.1	124.9	20 58.6	125.7	20 17.9	126.4	19 36.9	127.2	30
20	24 05.9	125.8	23 24.6	126.6	22 43.0	127.4	22 01.2	128.2	21 19.1	129.0	20
10	25 49.9	127.7	25 07.5	128.5	24 24.8	129.3	23 42.1	130.0	22 58.8	130.8	10
3 00	27 31.4	129.6	26 47.9	130.4	26 04.1	131.2	25 20.1	131.9	24 35.8	132.7	3 00
2 50	29 09.9	131.6	28 25.5	132.4	27 40.2	133.2	26 55.1	133.9	26 09.7	134.7	50
40	30 45.5	133.7	29 59.7	134.5	29 13.6	135.2	28 27.3	136.0	27 40.7	136.7	40
30	32 17.6	135.9	31 30.6	136.6	30 43.2	137.3	29 55.8	138.1	29 08.0	138.8	30
20	33 46.1	138.2	32 57.9	138.9	32 09.4	139.6	31 20.7	140.3	30 31.7	141.0	20
10	35 10.6	140.6	34 21.3	141.3	33 31.5	142.0	32 41.7	142.6	31 51.5	143.3	10
2 00	36 31.0	143.1	35 40.4	143.7	34 49.5	144.4	33 58.3	145.0	33 07.0	145.6	2 00
1 50	37 46.6	145.7	36 54.8	146.3	36 02.7	146.9	35 10.5	147.5	34 18.1	148.1	1 50
40	38 57.5	148.3	38 04.5	148.9	37 11.3	149.5	36 17.9	150.1	35 24.3	150.7	40
30	40 02.8	151.1	39 08.7	151.7	38 14.4	152.2	37 19.9	152.8	36 25.2	153.3	30
20	41 02.8	154.0	40 07.6	154.5	39 12.2	155.0	38 16.7	155.5	37 21.0	156.0	20
10	41 56.5	157.0	41 00.2	157.5	40 03.9	157.9	39 07.5	158.4	38 10.9	158.8	10
1 00	42 44.1	160.1	41 46.9	160.5	40 49.7	160.9	39 52.3	161.3	38 54.9	161.7	1 00
0 50	43 24.9	163.3	42 26.8	163.6	41 28.8	164.0	40 30.8	164.3	39 32.6	164.6	0 50
40	43 58.9	166.5	43 00.2	166.8	42 01.5	167.1	41 03.8	167.4	40 04.9	167.6	40
30	44 25.4	169.8	43 26.1	170.1	42 26.9	170.3	41 27.5	170.5	40 28.2	170.7	30
20	44 44.6	173.2	43 45.0	173.4	42 45.3	173.5	41 45.6	173.6	40 45.8	173.8	20
10	44 56.1	176.6	43 56.2	176.7	42 56.3	176.7	41 56.4	176.8	40 56.5	176.9	10
0 00	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 17.6	113.4									5 10
5 00	2 16.2	114.7	1 43.4	115.6	1 10.5	116.4	0 37.7	117.2	0 04.8	118.1	5 00
4 50	4 13.5	116.0	3 39.9	116.9	3 06.2	117.7	2 32.5	118.5	1 58.7	119.3	4 50
40	6 09.7	117.4	5 35.2	118.2	5 00.6	119.0	4 26.0	119.8	3 51.3	120.6	40
30	8 04.2	118.7	7 28.9	119.5	6 53.4	120.4	6 17.8	121.2	5 42.2	122.0	30
20	9 57.4	120.2	9 21.1	121.0	8 44.7	121.8	8 08.2	122.6	7 31.6	123.4	20
10	11 48.8	121.6	11 11.6	122.4	10 34.2	123.2	9 56.8	124.0	9 19.2	124.8	10
4 00	13 38.6	123.1	13 00.4	123.9	12 22.0	124.7	11 43.5	125.5	11 04.9	126.3	4 00
3 50	15 26.3	124.7	14 47.2	125.5	14 07.8	126.3	13 28.2	127.0	12 48.6	127.8	3 50
40	17 12.2	126.3	16 31.9	127.1	15 51.5	127.9	15 10.9	128.6	14 30.1	129.4	40
30	18 55.7	128.0	18 14.4	128.8	17 32.9	129.5	16 51.2	130.2	16 09.3	131.0	30
20	20 36.9	129.7	19 54.5	130.5	19 11.9	131.2	18 29.1	131.9	17 46.2	132.7	20
10	22 15.5	131.5	21 32.0	132.3	20 48.2	133.0	20 04.4	133.7	19 20.2	134.5	10
3 00	23 51.3	133.4	23 06.6	134.1	22 21.8	134.9	21 36.7	135.6	20 51.5	136.3	3 00
2 50	25 24.2	135.4	24 38.3	136.1	23 52.3	136.8	23 06.2	137.5	22 19.8	138.2	2 50
40	26 53.9	137.4	26 06.9	138.1	25 19.7	138.8	24 32.3	139.4	23 44.7	140.1	40
30	28 20.1	139.5	27 31.9	140.2	26 43.6	140.8	25 55.1	141.4	25 06.3	142.1	30
20	29 42.6	141.6	28 53.3	142.3	28 03.8	142.9	27 14.1	143.6	26 24.2	144.2	20
10	31 01.2	143.9	30 10.7	144.6	29 20.1	145.2	28 29.2	145.8	27 38.2	146.4	10
2 00	32 15.5	146.2	31 23.9	146.8	30 32.2	147.4	29 40.3	148.0	28 48.2	148.6	2 00
1 50	33 25.5	148.7	32 32.7	149.3	31 39.7	149.8	30 46.8	150.4	29 53.6	150.9	1 50
40	34 30.6	151.2	33 36.8	151.7	32 42.8	152.2	31 48.6	152.7	30 54.4	153.2	40
30	35 30.6	153.8	34 35.7	154.3	33 40.7	154.8	32 45.7	155.2	31 50.4	155.7	30
20	36 25.3	156.5	35 29.5	156.9	34 33.5	157.4	33 37.4	157.8	32 41.3	158.2	20
10	37 14.2	159.2	36 17.5	159.6	35 20.6	160.0	34 23.8	160.4	33 26.8	160.8	10
1 00	37 57.4	162.0	36 59.8	162.4	36 02.2	162.7	35 04.5	163.1	34 06.8	163.4	1 00
0 50	38 34.2	164.9	37 36.2	165.2	36 37.7	165.5	35 39.3	165.8	34 40.9	166.1	0 50
40	39 04.9	167.9	38 06.0	168.1	37 07.1	168.3	36 08.2	168.6	35 09.2	168.8	40
30	39 28.8	170.9	38 29.5	171.1	37 30.2	171.2	36 30.7	171.4	35 31.3	171.6	30
20	39 46.1	173.9	38 46.4	174.0	37 46.7	174.1	36 46.9	174.3	35 47.2	174.4	20
10	39 56.5	176.9	38 56.6	177.0	37 56.7	177.1	36 56.7	177.2	35 56.8	177.2	10
0 00	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0	0 30.9	89.2	1 01.8	88.3	1 32.7	87.4	2 03.5	86.6	6 00
5 50	2 08.6	91.3	2 39.4	90.4	3 10.3	89.6	3 41.1	88.7	4 11.9	87.8	5 50
40	4 17.1	92.6	4 48.0	91.7	5 18.9	90.9	5 49.8	90.0	6 20.5	89.1	40
30	6 25.5	93.9	6 56.5	93.0	7 27.3	92.2	7 58.2	91.3	8 29.0	90.4	30
20	8 33.6	95.2	9 04.9	94.3	9 36.0	93.5	10 06.9	92.6	10 37.7	91.7	20
10	10 41.6	96.5	11 12.9	95.6	11 44.1	94.8	12 15.1	93.9	12 46.1	93.0	10
5 00	12 49.1	97.9	13 20.6	97.0	13 52.1	96.1	14 23.3	95.2	14 54.3	94.4	5 00
4 50	14 56.3	99.2	15 28.1	98.3	15 59.7	97.4	16 31.2	96.6	17 02.4	95.7	4 50
40	17 02.9	100.6	17 35.1	99.7	18 07.0	98.8	18 38.8	98.0	19 10.2	97.1	40
30	19 09.0	102.0	19 41.4	101.1	20 13.8	100.2	20 45.8	99.4	21 17.6	98.5	30
20	21 14.3	103.5	21 47.4	102.6	22 20.1	101.7	22 52.5	100.8	23 24.6	99.9	20
10	23 19.0	105.0	23 52.3	104.1	24 25.6	103.2	24 58.4	102.3	25 30.9	101.4	10
4 00	25 22.6	106.6	25 56.8	105.7	26 30.4	104.7	27 03.7	103.8	27 36.7	102.9	4 00
3 50	27 25.4	108.2	27 59.9	107.3	28 34.2	106.3	29 08.1	105.4	29 41.5	104.4	3 50
40	29 27.0	109.8	30 02.3	108.9	30 37.2	108.0	31 11.7	107.0	31 45.7	106.0	40
30	31 27.2	111.6	32 03.2	110.6	32 38.9	109.7	33 14.0	108.7	33 48.6	107.7	30
20	33 26.0	113.4	34 02.9	112.4	34 39.3	111.5	35 15.2	110.5	35 50.6	109.5	20
10	35 23.2	115.3	36 00.8	114.3	36 38.1	113.4	37 14.9	112.4	37 51.0	111.3	10
3 00	37 18.5	117.3	37 57.1	116.3	38 35.3	115.3	39 12.9	114.3	39 50.0	113.3	3 00
2 50	39 11.7	119.3	39 51.3	118.4	40 30.5	117.4	41 09.0	116.4	41 47.2	115.3	2 50
40	41 02.6	121.5	41 43.3	120.6	42 23.5	119.6	43 03.3	118.5	43 42.4	117.5	40
30	42 50.8	123.9	43 32.7	122.9	44 14.1	122.0	44 54.9	120.9	45 35.2	119.8	30
20	44 36.0	126.3	45 19.2	125.4	46 01.8	124.4	46 43.9	123.3	47 25.4	122.3	20
10	46 17.7	128.9	47 02.2	128.0	47 46.2	127.0	48 29.8	125.9	49 12.5	124.9	10
2 00	47 55.9	131.7	48 41.7	130.8	49 27.1	129.8	50 11.9	128.7	50 56.2	127.7	2 00
1 50	49 29.4	134.7	50 16.8	133.8	51 03.8	132.8	51 50.0	131.7	52 35.8	130.7	1 50
40	50 58.5	137.8	51 47.2	136.9	52 35.6	135.9	53 23.6	134.9	54 10.9	133.9	40
30	52 21.8	141.3	53 12.2	140.3	54 02.4	139.4	54 51.8	138.4	55 40.8	137.4	30
20	53 39.4	144.8	54 31.3	143.9	55 22.9	143.0	56 14.2	142.1	57 04.8	141.1	20
10	54 50.0	148.6	55 43.6	147.8	56 36.9	146.9	57 29.5	146.1	58 22.0	145.1	10
1 00	55 53.4	152.5	56 48.4	151.8	57 43.1	151.0	58 37.6	150.2	59 31.7	149.4	1 00
0 50	56 48.5	156.8	57 45.0	156.1	58 41.1	155.4	59 37.0	154.7	60 32.5	154.0	0 50
40	57 34.8	161.1	58 32.4	160.6	59 29.9	160.0	60 27.2	159.4	61 24.3	158.8	40
30	58 11.6	165.7	59 10.1	165.3	60 08.6	164.8	61 07.0	164.4	62 05.6	163.9	30
20	58 38.4	170.4	59 37.8	170.1	60 37.1	169.8	61 36.4	169.5	62 35.6	169.1	20
10	58 54.6	175.2	59 54.4	175.0	60 54.2	174.9	61 54.0	174.7	62 53.9	174.5	10
0 00	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0 0	180.0	63 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	. m.
6 20									0 23. 3	79. 7	6 20
10	0 26. 2	84. 4	0 57. 2	83. 6	1 28. 1	82. 7	1 59. 1	81. 9	2 30. 1	81. 0	10
6 00	2 34. 3	85. 7	3 05. 1	84. 9	3 35. 9	84. 0	4 06. 6	83. 1	4 37. 3	82. 3	6 00
5 50	4 42. 7	87. 0	5 13. 3	86. 1	5 43. 9	85. 3	6 14. 4	84. 4	6 44. 8	83. 5	5 50
40	6 51. 2	88. 3	7 21. 7	87. 4	7 52. 2	86. 5	8 22. 5	85. 7	8 52. 8	84. 8	40
30	8 59. 7	89. 5	9 30. 1	88. 7	10 00. 5	87. 8	10 30. 8	86. 9	11 00. 9	86. 0	30
20	11 08. 3	90. 8	11 38. 8	90. 0	12 09. 2	89. 1	12 39. 3	88. 2	13 09. 3	87. 3	20
10	13 16. 8	92. 1	13 47. 3	91. 3	14 17. 6	90. 4	14 47. 9	89. 5	15 17. 7	88. 6	10
5 00	15 25. 2	93. 5	15 55. 8	92. 6	16 26. 3	91. 7	16 56. 4	90. 8	17 26. 4	89. 9	5 00
4 50	17 33. 4	94. 8	18 04. 2	93. 9	18 34. 6	93. 0	19 04. 9	92. 1	19 34. 9	91. 2	4 50
40	19 41. 5	96. 1	20 12. 3	95. 2	20 43. 0	94. 3	21 13. 4	93. 4	21 43. 4	92. 5	40
30	21 49. 2	97. 5	22 20. 3	96. 6	22 51. 1	95. 7	23 21. 6	94. 7	23 51. 8	93. 8	30
20	23 56. 3	98. 9	24 27. 8	98. 0	24 58. 9	97. 1	25 29. 6	96. 1	26 00. 0	95. 2	20
10	26 03. 1	100. 4	26 34. 8	99. 4	27 06. 2	98. 5	27 37. 2	97. 5	28 07. 6	96. 6	10
4 00	28 09. 2	101. 9	28 41. 4	100. 9	29 13. 2	100. 0	29 44. 5	99. 0	30 15. 4	98. 0	4 00
3 50	30 14. 6	103. 5	30 47. 2	102. 5	31 19. 4	101. 5	31 51. 2	100. 5	32 22. 4	99. 5	3 50
40	32 19. 2	105. 1	32 52. 4	104. 1	33 25. 1	103. 1	33 57. 4	102. 1	34 29. 1	101. 0	40
30	34 23. 0	106. 7	34 56. 7	105. 7	35 30. 0	104. 7	36 02. 7	103. 7	36 34. 7	102. 6	30
20	36 25. 5	108. 5	36 59. 9	107. 5	37 33. 8	106. 4	38 07. 1	105. 4	38 39. 9	104. 3	20
10	38 26. 8	110. 3	39 01. 8	109. 3	39 36. 5	108. 2	40 10. 5	107. 2	40 44. 0	106. 1	10
3 00	40 26. 5	112. 3	41 02. 6	111. 2	41 38. 0	110. 1	42 12. 8	109. 0	42 46. 9	107. 9	3 00
2 50	42 24. 8	114. 3	43 01. 6	113. 2	43 37. 9	112. 1	44 13. 5	111. 0	44 48. 6	109. 9	2 50
40	44 20. 9	116. 4	44 58. 8	115. 3	45 36. 2	114. 2	46 12. 8	113. 1	46 48. 7	111. 9	40
30	46 14. 9	118. 7	46 53. 1	117. 6	47 32. 2	116. 5	48 10. 1	115. 3	48 47. 1	114. 1	30
20	48 06. 2	121. 2	48 46. 6	120. 1	49 26. 2	118. 9	50 05. 1	117. 7	50 43. 2	116. 5	20
10	49 54. 9	123. 8	50 36. 4	122. 6	51 17. 3	121. 5	51 57. 4	120. 3	52 36. 9	119. 1	10
2 00	51 39. 8	126. 6	52 22. 9	125. 4	53 05. 3	124. 3	53 47. 0	123. 1	54 27. 8	121. 8	2 00
1 50	53 21. 1	129. 6	54 05. 6	128. 5	54 49. 5	127. 3	55 32. 9	126. 1	56 15. 3	124. 8	1 50
40	54 57. 8	132. 8	55 44. 0	131. 7	56 29. 7	130. 5	57 14. 6	129. 3	57 58. 7	128. 1	40
30	56 29. 5	136. 3	57 17. 2	135. 2	58 04. 7	134. 1	58 51. 6	132. 9	59 37. 6	131. 6	30
20	57 55. 1	140. 1	58 44. 9	139. 0	59 34. 2	137. 9	60 22. 7	136. 8	61 10. 7	135. 5	20
10	59 14. 1	144. 1	60 05. 6	143. 1	60 56. 7	142. 1	61 47. 4	141. 0	62 37. 4	139. 8	10
1 00	60 25. 4	148. 5	61 18. 8	147. 6	62 11. 9	146. 6	63 04. 4	145. 5	63 56. 3	144. 4	1 00
0 50	61 28. 1	153. 2	62 23. 2	152. 3	63 18. 0	151. 4	64 12. 5	150. 5	65 06. 5	149. 5	0 50
40	62 21. 2	158. 1	63 17. 9	157. 4	64 14. 5	156. 6	65 10. 7	155. 8	66 06. 6	154. 9	40
30	63 03. 6	163. 4	64 01. 6	162. 8	64 59. 7	162. 2	65 57. 6	161. 5	66 55. 0	160. 8	30
20	63 34. 8	168. 8	64 33. 9	168. 4	65 33. 0	168. 0	66 31. 9	167. 5	67 30. 8	167. 0	20
10	63 53. 6	174. 3	64 53. 4	174. 1	65 53. 2	173. 9	66 52. 9	173. 7	67 52. 6	173. 4	10
0 00	64 0. 0	180. 0	65 0. 0	180. 0	66 0. 0	180. 0	67 0. 0	180. 0	68 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 23. 5	75. 1	0 55. 2	74. 2	6 30
20	0 54. 5	78. 9	1 25. 7	78. 0	1 56. 9	77. 2	2 28. 1	76. 3	2 59. 2	75. 5	20
10	3 01. 0	80. 1	3 31. 8	79. 3	4 02. 7	78. 4	4 33. 4	77. 6	5 04. 0	76. 7	10
6 00	5 07. 9	81. 4	5 38. 3	80. 5	6 08. 8	79. 7	6 39. 2	78. 8	7 09. 4	77. 9	6 00
5 50	7 15. 1	82. 7	7 45. 4	81. 8	8 15. 6	80. 9	8 45. 7	80. 1	9 15. 4	79. 2	5 50
40	9 22. 9	83. 9	9 52. 9	83. 0	10 22. 7	82. 1	10 52. 4	81. 3	11 22. 0	80. 4	40
30	11 30. 8	85. 1	12 00. 6	84. 3	12 30. 3	83. 4	12 59. 7	82. 5	13 28. 9	81. 6	30
20	13 39. 1	86. 4	14 08. 7	85. 5	14 38. 1	84. 6	15 07. 4	83. 7	15 36. 4	82. 8	20
10	15 47. 5	87. 7	16 17. 1	86. 8	16 46. 3	85. 9	17 15. 3	84. 9	17 44. 1	84. 0	10
5 00	17 55. 9	88. 9	18 25. 4	88. 0	18 54. 6	87. 1	19 23. 5	86. 2	19 52. 0	85. 2	5 00
4 50	20 04. 6	90. 2	20 33. 9	89. 3	21 03. 1	88. 3	21 31. 9	87. 4	22 00. 3	86. 5	4 50
40	22 13. 1	91. 5	22 42. 6	90. 6	23 11. 6	89. 6	23 40. 4	88. 7	24 08. 7	87. 7	40
30	24 21. 6	92. 8	24 51. 1	91. 9	25 20. 3	90. 9	25 48. 9	90. 0	26 17. 1	89. 0	30
20	26 30. 0	94. 2	26 59. 6	93. 2	27 28. 7	92. 2	27 57. 5	91. 3	28 25. 9	90. 3	20
10	28 38. 0	95. 6	29 07. 8	94. 6	29 37. 2	93. 6	30 05. 9	92. 6	30 34. 1	91. 6	10
4 00	30 45. 9	97. 0	31 15. 9	96. 0	31 45. 3	95. 0	32 14. 3	93. 9	32 42. 9	92. 9	4 00
3 50	32 53. 3	98. 5	33 23. 5	97. 4	33 53. 3	96. 4	34 22. 6	95. 3	34 51. 1	94. 3	3 50
40	35 00. 2	100. 0	35 30. 8	98. 9	36 00. 9	97. 9	36 30. 4	96. 8	36 59. 3	95. 7	40
30	37 06. 5	101. 6	37 37. 5	100. 5	38 07. 9	99. 4	38 37. 8	98. 3	39 07. 0	97. 2	30
20	39 12. 1	103. 2	39 43. 7	102. 1	40 14. 6	101. 0	40 44. 8	99. 9	41 14. 5	98. 7	20
10	41 16. 8	104. 9	41 48. 9	103. 8	42 20. 4	102. 7	42 51. 1	101. 5	43 21. 1	100. 3	10
3 00	43 20. 5	106. 8	43 53. 3	105. 6	44 25. 3	104. 4	44 56. 7	103. 2	45 27. 3	102. 0	3 00
2 50	45 22. 9	108. 7	45 56. 4	107. 5	46 29. 3	106. 3	47 01. 3	105. 1	47 32. 7	103. 8	2 50
40	47 24. 0	110. 8	47 58. 5	109. 5	48 32. 1	108. 3	49 05. 0	107. 0	49 37. 0	105. 7	40
30	49 23. 3	113. 0	49 58. 8	111. 7	50 33. 4	110. 4	51 07. 2	109. 1	51 39. 1	107. 8	30
20	51 20. 7	115. 3	51 57. 3	114. 0	52 33. 0	112. 7	53 07. 8	111. 3	53 41. 8	110. 0	20
10	53 15. 7	117. 8	53 53. 6	116. 5	54 30. 5	115. 2	55 06. 7	113. 8	55 41. 7	112. 3	10
2 00	55 08. 1	120. 5	55 47. 4	119. 2	56 25. 7	117. 8	57 03. 1	116. 4	57 39. 6	114. 9	2 00
1 50	56 57. 0	123. 5	57 37. 9	122. 2	58 17. 7	120. 8	58 56. 9	119. 3	59 34. 9	117. 8	1 50
40	58 42. 2	126. 8	59 24. 9	125. 4	60 06. 5	124. 0	60 47. 1	122. 5	61 26. 9	120. 9	40
30	60 22. 7	130. 3	61 07. 4	128. 9	61 50. 9	127. 5	62 33. 5	126. 0	63 15. 1	124. 4	30
20	61 58. 0	134. 2	62 44. 6	132. 8	63 30. 2	131. 4	64 14. 9	129. 9	64 58. 8	128. 3	20
10	63 26. 8	138. 5	64 15. 5	137. 2	65 03. 4	135. 8	65 50. 4	134. 3	66 36. 4	132. 7	10
1 00	64 47. 9	143. 2	65 38. 9	141. 9	66 29. 1	140. 6	67 18. 4	139. 1	68 07. 2	137. 6	1 00
0 50	66 00. 2	148. 4	66 53. 4	147. 2	67 45. 8	146. 0	68 38. 0	144. 6	69 29. 0	143. 1	0 50
40	67 02. 3	154. 0	67 57. 6	153. 0	68 52. 5	151. 9	69 46. 8	150. 7	70 40. 7	149. 4	40
30	67 52. 5	160. 1	68 49. 7	159. 2	69 46. 4	158. 3	70 43. 2	157. 3	71 39. 2	156. 3	30
20	68 29. 7	166. 5	69 28. 4	165. 9	70 26. 8	165. 2	71 25. 3	164. 5	72 23. 7	163. 8	20
10	68 52. 3	173. 2	69 52. 0	172. 9	70 51. 6	172. 5	71 51. 2	172. 2	72 50. 7	171. 8	10
0 00	69 0. 0	180. 0	70 0. 0	180. 0	71 0. 0	180. 0	72 0. 0	180. 0	73 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40					0 28.4	70.4	1 00.6	69.5	1 32.7	68.7	6 40
30	1 26.8	73.3	1 58.2	72.5	2 29.9	71.6	3 01.3	70.8	3 32.8	69.9	30
20	3 30.3	74.6	4 01.3	73.7	4 32.3	72.9	5 03.3	72.0	5 34.2	71.2	20
10	5 34.7	75.8	6 05.1	75.0	6 35.6	74.1	7 05.9	73.2	7 36.2	72.4	10
6 00	7 39.6	77.1	8 09.7	76.2	8 39.6	75.3	9 09.5	74.4	9 39.2	73.6	6 00
5 50	9 45.2	78.3	10 14.8	77.4	10 44.4	76.5	11 13.6	75.6	11 42.8	74.7	5 50
40	11 51.5	79.5	12 20.7	78.6	12 49.8	77.7	13 18.6	76.8	13 47.2	75.9	40
30	13 58.0	80.7	13 26.9	79.8	14 55.5	78.9	15 23.9	78.0	15 52.2	77.0	30
20	16 05.2	81.9	16 33.7	81.0	17 02.0	80.1	17 30.1	79.1	17 57.8	78.2	20
10	18 12.7	83.1	18 40.8	82.2	19 08.8	81.2	19 36.5	80.3	20 03.8	79.3	10
5 00	20 20.4	84.3	20 48.4	83.4	21 16.1	82.4	21 43.5	81.5	22 10.5	80.5	5 00
4 50	22 28.3	85.5	22 56.2	84.6	23 23.7	83.6	23 50.8	82.6	24 17.5	81.6	4 50
40	24 36.8	86.7	25 04.4	85.8	25 31.7	84.8	25 58.6	83.8	26 24.9	82.8	40
30	26 45.1	88.0	27 12.7	87.0	27 39.8	86.0	28 06.3	85.0	28 32.6	83.9	30
20	28 53.7	89.2	29 21.2	88.2	29 48.1	87.2	30 14.6	86.2	30 40.6	85.1	20
10	31 02.2	90.5	31 29.7	89.5	31 56.6	88.4	32 22.9	87.4	32 48.7	86.3	10
4 00	33 10.9	91.8	33 38.3	90.8	34 05.2	89.7	34 31.5	88.6	34 57.3	87.5	4 00
3 50	35 19.2	93.2	35 46.8	92.1	36 13.8	91.0	36 40.0	89.9	37 05.7	88.7	3 50
40	37 27.6	94.6	37 55.3	93.5	38 22.3	92.3	38 48.6	91.2	39 14.3	90.0	40
30	39 35.7	96.0	40 03.4	94.9	40 30.6	93.7	40 57.1	92.5	41 22.7	91.3	30
20	41 43.4	97.5	42 11.5	96.4	42 38.9	95.1	43 05.5	93.9	43 31.4	92.7	20
10	43 50.5	99.1	44 19.0	97.9	44 46.8	96.6	45 13.7	95.4	45 39.7	94.1	10
3 00	45 57.2	100.8	46 26.1	99.5	46 54.2	98.2	47 21.5	96.9	47 47.8	95.6	3 00
2 50	48 03.1	102.5	48 32.5	101.2	49 01.2	99.8	49 28.8	98.5	49 55.5	97.1	2 50
40	50 08.2	104.4	50 38.4	103.0	51 07.5	101.6	51 35.8	100.2	52 03.0	98.8	40
30	52 12.0	106.4	52 43.0	105.0	53 13.0	103.5	53 41.9	102.1	54 09.6	100.6	30
20	54 14.8	108.5	54 46.6	107.1	55 17.4	105.6	55 47.1	104.0	56 15.7	102.5	20
10	56 15.8	110.8	56 48.8	109.4	57 20.7	107.8	57 51.1	106.2	58 20.5	104.5	10
2 00	58 15.0	113.4	58 49.2	111.8	59 22.2	110.2	59 54.0	108.5	60 24.5	106.8	2 00
1 50	60 11.8	116.2	60 47.2	114.6	61 21.9	112.9	61 54.8	111.1	62 26.6	109.3	1 50
40	62 05.7	119.3	62 43.0	117.6	63 18.9	115.8	63 27.1	114.0	64 58.7	112.1	40
30	63 55.7	122.7	64 34.8	121.0	65 13.0	119.2	65 49.5	117.3	66 24.6	115.3	30
20	65 41.6	126.6	66 23.0	124.9	67 03.1	123.0	67 41.9	121.0	68 19.4	118.9	20
10	67 21.5	131.0	68 05.5	129.2	68 48.2	127.3	69 29.8	125.3	70 09.5	123.1	10
1 00	68 55.1	135.9	69 41.6	134.2	70 27.0	132.3	71 11.4	130.2	71 54.4	128.0	1 00
0 50	70 19.8	141.6	71 09.2	139.9	71 57.8	138.1	72 45.2	136.0	73 31.2	133.8	0 50
40	71 34.1	148.0	72 26.6	146.4	73 18.2	144.7	74 09.1	142.8	74 59.1	140.7	40
30	72 35.2	155.1	73 30.5	153.8	74 25.5	152.3	75 19.8	150.6	76 13.0	148.8	30
20	73 21.7	162.9	74 19.4	161.9	75 16.9	160.9	76 14.0	159.6	77 10.9	158.2	20
10	73 50.2	171.3	74 49.6	170.8	75 49.0	170.2	76 48.2	169.6	77 47.4	168.8	10
0 00	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 23.5	62.0	7 00
6 50	0 06.1	66.6	0 39.1	65.7	1 11.8	64.9	1 44.7	64.0	2 17.5	63.2	6 50
40	2 04.8	67.8	2 36.9	67.0	3 08.9	66.1	3 41.0	65.3	4 13.0	64.4	40
30	4 04.3	69.1	4 35.7	68.2	5 07.0	67.3	5 38.2	66.5	6 09.4	65.6	30
20	6 05.0	70.3	6 35.7	69.4	7 06.3	68.5	7 36.9	67.7	8 07.2	66.8	20
10	8 06.3	71.5	8 36.4	70.6	9 06.3	69.7	9 36.1	68.9	10 05.7	68.0	10
6 00	10 08.8	72.7	10 38.2	71.8	11 07.5	70.9	11 36.6	70.0	12 05.6	69.1	6 00
5 50	12 11.7	73.8	12 40.7	72.9	13 09.2	72.0	13 37.7	71.1	14 06.0	70.2	5 50
40	14 15.7	75.0	14 43.9	74.1	15 12.0	73.2	15 39.9	72.2	16 07.5	71.3	40
30	16 20.2	76.1	16 47.9	75.2	17 15.3	74.3	17 42.6	73.3	18 09.7	72.4	30
20	18 25.4	77.3	18 52.6	76.3	19 19.6	75.4	19 46.2	74.4	20 12.6	73.5	20
10	20 30.9	78.4	20 57.7	77.4	21 24.2	76.5	21 50.3	75.5	22 16.2	74.6	10
5 00	22 37.2	79.5	23 03.6	78.5	23 29.5	77.6	23 55.2	76.6	24 20.4	75.6	5 00
4 50	24 43.8	80.6	24 09.8	79.6	25 35.3	78.6	26 00.5	77.6	26 25.1	76.6	4 50
40	26 50.9	81.8	27 16.5	80.8	27 41.7	79.7	28 06.3	78.7	28 30.6	77.7	40
30	28 58.2	82.9	29 23.6	81.9	29 48.3	80.8	30 12.7	79.8	30 36.4	78.8	30
20	31 06.1	84.1	31 31.0	83.0	31 55.5	81.9	32 19.4	80.8	32 42.7	79.8	20
10	33 14.0	85.2	33 38.8	84.1	34 02.8	83.0	34 26.5	81.9	34 49.4	80.8	10
4 00	35 22.3	86.4	35 46.8	85.3	36 10.8	84.2	36 34.0	83.0	36 56.6	81.9	4 00
3 50	37 30.7	87.6	37 55.1	86.5	38 18.7	85.3	38 41.7	84.1	39 03.8	82.9	3 50
40	39 39.2	88.9	40 03.4	87.7	40 27.0	86.5	40 49.8	85.2	41 11.7	84.0	40
30	41 47.7	90.1	42 12.0	88.9	42 35.4	87.7	42 57.9	86.4	43 19.7	85.1	30
20	43 56.4	91.4	44 20.6	90.2	44 43.9	88.9	45 06.4	87.6	45 28.0	86.3	20
10	46 04.9	92.8	46 29.1	91.5	46 52.5	90.2	47 14.7	88.8	47 36.2	87.4	10
3 00	48 13.2	94.2	48 37.5	92.9	49 01.0	91.5	49 23.4	90.0	49 44.7	88.6	3 00
2 50	50 21.2	95.7	50 45.9	94.3	51 09.5	92.8	51 31.9	91.3	51 53.2	89.9	2 50
40	52 29.0	97.3	52 53.9	95.8	53 17.8	94.3	53 40.5	92.7	54 01.9	91.2	40
30	54 36.2	99.0	55 01.6	97.4	55 25.9	95.8	55 48.7	94.2	56 10.4	92.6	30
20	56 42.9	100.9	57 08.9	99.2	57 33.6	97.5	57 56.9	95.8	58 18.8	94.1	20
10	58 48.6	102.8	59 15.5	101.1	59 40.7	99.3	60 04.5	97.5	60 26.7	95.6	10
2 00	60 53.5	105.0	61 21.1	103.2	61 47.3	101.3	62 11.9	99.3	62 34.7	97.3	2 00
1 50	62 57.1	107.4	63 25.7	105.5	63 52.9	103.5	64 18.2	101.4	64 41.7	99.3	1 50
40	64 58.7	110.1	65 28.7	108.0	65 57.2	105.9	66 23.9	103.7	66 48.3	101.4	40
30	66 58.2	113.2	67 30.0	111.0	68 00.0	108.7	68 28.0	106.3	68 53.7	103.8	30
20	68 54.9	116.7	69 28.6	114.3	70 00.6	111.9	70 30.6	109.4	70 57.8	106.7	20
10	70 47.6	120.8	71 24.0	118.3	71 58.2	115.7	72 30.2	113.0	73 00.0	110.1	10
1 00	72 35.3	125.6	73 14.5	123.1	73 51.9	120.3	74 27.1	117.3	74 59.2	114.1	1 00
0 50	74 15.7	131.4	74 58.5	128.8	75 39.5	125.8	76 18.2	122.7	76 54.0	119.2	0 50
40	75 47.3	138.3	76 33.8	135.8	77 19.2	132.8	78 02.5	129.5	78 42.6	125.7	40
30	77 05.5	146.6	77 57.0	144.3	78 46.5	141.4	79 34.5	138.3	80 20.5	134.5	30
20	78 07.0	156.5	79 02.3	154.7	79 57.1	152.4	80 50.8	149.7	81 43.0	146.5	20
10	78 46.4	167.9	79 45.1	166.8	80 43.6	165.5	81 41.8	163.8	82 39.5	161.8	10
0 00	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	83 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 08. 6	91. 3	1 37. 6	92. 1	1 06. 7	93. 0	0 35. 7	93. 9	0 04. 8	94. 7	5 50
40	4 17. 1	92. 6	3 46. 0	93. 4	3 15. 0	94. 3	2 43. 9	95. 2	2 12. 7	96. 0	40
30	6 25. 5	93. 9	5 54. 3	94. 7	5 23. 0	95. 6	4 51. 8	96. 5	4 20. 4	97. 3	30
20	8 33. 6	95. 2	8 02. 3	96. 0	7 30. 9	96. 9	6 59. 4	97. 8	6 27. 8	98. 6	20
10	10 41. 6	96. 5	10 10. 0	97. 3	9 38. 3	98. 2	9 06. 4	99. 1	8 34. 7	100. 0	10
5 00	12 49. 1	97. 9	12 17. 3	98. 7	11 45. 4	99. 6	11 13. 3	100. 4	10 41. 1	101. 3	5 00
4 50	14 56. 3	99. 2	14 24. 1	100. 1	13 51. 8	101. 0	13 19. 4	101. 8	12 46. 8	102. 7	4 50
40	17 02. 9	100. 6	16 30. 5	101. 5	15 57. 8	102. 4	15 25. 0	103. 2	14 51. 9	104. 1	40
30	19 09. 0	102. 0	18 36. 0	102. 9	18 03. 0	103. 8	17 29. 6	104. 6	16 56. 2	105. 5	30
20	21 14. 3	103. 5	20 41. 0	104. 4	20 07. 5	105. 3	19 33. 7	106. 1	18 59. 6	107. 0	20
10	23 19. 0	105. 0	22 45. 0	105. 9	22 11. 0	106. 8	21 36. 7	107. 7	21 01. 9	108. 5	10
4 00	25 22. 6	106. 6	24 48. 3	107. 5	24 13. 6	108. 4	23 38. 6	109. 3	23 03. 3	110. 1	4 00
3 50	27 25. 4	108. 2	26 50. 3	109. 1	26 15. 1	110. 0	25 39. 3	110. 9	25 03. 3	111. 7	3 50
40	29 27. 0	109. 8	28 51. 3	110. 8	28 15. 3	111. 7	27 38. 9	112. 6	27 02. 1	113. 4	40
30	31 27. 2	111. 6	30 50. 8	112. 5	30 14. 1	113. 4	29 36. 8	114. 3	28 59. 2	115. 2	30
20	33 26. 0	113. 4	32 48. 8	114. 3	32 11. 2	115. 2	31 33. 1	116. 2	30 54. 7	117. 1	20
10	35 23. 2	115. 3	34 45. 0	116. 2	34 06. 6	117. 1	33 27. 6	118. 1	32 48. 2	119. 0	10
3 00	37 18. 5	117. 3	36 39. 5	118. 2	35 59. 9	119. 1	35 20. 0	120. 1	34 39. 6	121. 0	3 00
2 50	39 11. 7	119. 3	38 31. 6	120. 3	37 51. 1	121. 2	37 10. 0	122. 2	36 28. 7	123. 1	2 50
40	41 02. 6	121. 5	40 21. 4	122. 5	39 39. 7	123. 4	38 57. 5	124. 4	38 15. 0	125. 3	40
30	42 50. 8	123. 9	42 08. 4	124. 8	41 25. 7	125. 7	40 42. 2	126. 7	39 58. 5	127. 6	30
20	44 36. 0	126. 3	43 52. 4	127. 3	43 08. 3	128. 2	42 23. 7	129. 1	41 38. 7	130. 0	20
10	46 17. 7	128. 9	45 32. 8	129. 9	44 47. 4	130. 8	44 01. 6	131. 7	43 15. 2	132. 6	10
2 00	47 55. 9	131. 7	47 09. 5	132. 7	46 22. 7	133. 6	45 35. 5	134. 5	44 47. 8	135. 3	2 00
1 50	49 29. 4	134. 7	48 41. 7	135. 6	47 53. 6	136. 5	47 04. 8	137. 4	46 15. 9	138. 2	1 50
40	50 58. 5	137. 8	50 09. 2	138. 7	49 19. 5	139. 6	48 29. 4	140. 4	47 39. 0	141. 2	40
30	52 21. 8	141. 3	51 31. 1	142. 1	50 40. 0	142. 9	49 48. 5	143. 7	48 56. 6	144. 4	30
20	53 39. 4	144. 8	52 47. 0	145. 6	51 54. 5	146. 3	51 01. 5	147. 1	50 08. 3	147. 8	20
10	54 50. 0	148. 6	53 56. 2	149. 3	53 02. 3	150. 0	52 07. 9	150. 7	51 13. 3	151. 4	10
1 00	55 53. 4	152. 5	54 58. 2	153. 2	54 02. 8	153. 9	53 07. 1	154. 5	52 11. 3	155. 1	1 00
0 50	56 48. 5	156. 8	55 52. 0	157. 3	54 55. 4	157. 9	53 58. 4	158. 4	53 01. 4	159. 0	0 50
40	57 34. 8	161. 1	56 37. 2	161. 6	55 39. 3	162. 1	54 41. 4	162. 5	53 43. 4	163. 0	40
30	58 11. 6	165. 7	57 12. 6	166. 1	56 14. 2	166. 4	55 15. 4	166. 8	54 16. 6	167. 1	30
20	58 38. 4	170. 4	57 39. 0	170. 6	56 39. 6	170. 9	55 40. 2	171. 1	54 40. 7	171. 4	20
10	58 54. 6	175. 2	57 54. 6	175. 3	56 54. 9	175. 4	55 55. 0	175. 5	54 55. 1	175. 7	10
0 00	59 0. 0	180. 0	58 0. 0	180. 0	57 0. 0	180. 0	56 0. 0	180. 0	55 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 41.6	96.9	1 10.4	97.7	0 39.2	98.6	0 08.0	99.4			5 40
30	3 49.0	98.2	3 17.5	99.0	2 46.1	99.9	2 14.5	100.7	1 42.9	101.6	30
20	5 56.1	99.5	5 24.3	100.3	4 52.5	101.2	4 20.6	102.0	3 48.6	102.9	20
10	8 02.6	100.8	7 30.5	101.6	6 58.3	102.5	6 26.0	103.3	5 53.5	104.2	10
5 00	10 08.7	102.2	9 36.2	103.0	9 03.5	103.9	8 30.7	104.7	7 57.9	105.6	5 00
4 50	12 13.9	103.6	11 41.1	104.4	11 07.9	105.3	10 34.6	106.1	10 01.2	107.0	4 50
40	14 18.6	105.0	13 45.1	105.8	13 11.6	106.7	12 37.7	107.5	12 03.8	108.4	40
30	16 22.4	106.4	15 48.3	107.3	15 14.2	108.1	14 39.8	109.0	14 05.2	109.8	30
20	18 25.3	107.9	17 50.7	108.8	17 15.9	109.6	16 40.9	110.5	16 05.7	111.3	20
10	20 27.1	109.4	19 51.9	110.3	19 16.4	111.1	18 40.7	112.0	18 04.9	112.8	10
4 00	22 27.7	111.0	21 51.8	111.9	21 15.6	112.7	20 39.2	113.6	20 02.6	114.4	4 00
3 50	24 27.0	112.6	23 50.4	113.5	23 13.6	114.4	22 36.3	115.2	21 58.9	116.0	3 50
40	26 25.0	114.3	25 47.6	115.2	25 09.9	116.1	24 31.9	116.9	23 53.6	117.7	40
30	28 21.3	116.1	27 43.1	117.0	27 04.6	117.9	26 25.6	118.7	25 46.4	119.5	30
20	30 15.8	117.9	29 36.7	118.8	28 57.2	119.7	28 17.4	120.5	27 37.3	121.4	20
10	32 08.4	119.8	31 28.3	120.7	30 47.9	121.6	30 07.1	122.4	29 25.9	123.3	10
3 00	33 58.9	121.8	33 17.7	122.7	32 36.2	123.6	31 54.4	124.4	31 12.2	125.3	3 00
2 50	35 46.8	123.9	35 04.7	124.8	34 22.1	125.7	33 39.0	126.5	32 55.8	127.4	2 50
40	37 32.1	126.1	36 48.8	127.0	36 05.0	127.9	35 20.9	128.7	34 36.6	129.5	40
30	39 14.3	128.5	38 29.9	129.4	37 44.9	130.2	36 59.7	131.0	36 04.1	131.8	30
20	40 53.4	130.9	40 07.6	131.8	39 21.4	132.6	38 34.9	133.4	37 48.1	134.2	20
10	42 28.7	133.5	41 41.6	134.3	40 54.2	135.1	40 06.4	135.9	39 18.3	136.7	10
2 00	43 59.9	136.2	43 11.5	137.0	42 22.8	137.8	41 33.7	138.6	40 44.4	139.3	2 00
1 50	45 26.5	139.0	44 36.8	139.8	43 46.7	140.6	42 56.5	141.4	42 05.8	142.1	1 50
40	46 48.3	142.0	45 57.2	142.8	45 05.8	143.5	44 14.1	144.3	43 22.3	145.0	40
30	48 04.5	145.2	47 12.1	145.9	46 19.5	146.6	45 26.5	147.3	44 33.3	148.0	30
20	49 14.8	148.5	48 21.0	149.2	47 27.1	149.9	46 32.9	150.5	45 38.5	151.1	20
10	50 18.5	152.0	49 23.5	152.6	48 28.4	153.2	47 33.0	153.8	46 37.4	154.4	10
1 00	51 15.2	155.7	50 19.0	156.2	49 22.7	156.8	48 26.2	157.3	47 29.6	157.8	1 00
0 50	52 04.2	159.5	51 07.1	159.9	50 09.7	160.4	49 12.1	160.9	48 14.5	161.3	0 50
40	52 45.3	163.4	51 47.0	163.8	50 48.7	164.2	49 50.4	164.5	48 52.0	164.9	40
30	53 17.4	167.4	52 18.6	167.7	51 19.7	168.0	50 20.6	168.3	49 21.5	168.6	30
20	53 41.1	171.6	52 41.6	171.8	51 42.0	172.0	50 42.5	172.2	49 42.9	172.4	20
10	53 55.2	175.8	52 55.4	175.9	51 55.4	176.0	50 55.6	176.1	49 55.7	176.2	10
0 00	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 11.2	102.4	0 39.7	103.3	0 08.1	104.1					5 30
20	3 16.5	103.7	2 44.2	104.6	2 12.4	105.4	1 40.3	106.3	1 08.1	107.1	20
10	5 21.1	105.0	4 48.6	105.9	4 16.0	106.7	3 43.3	107.6	3 10.7	108.4	10
5 00	7 24.9	106.4	6 51.8	107.3	6 18.6	108.1	5 45.4	108.9	5 12.1	109.8	5 00
4 50	9 27.7	107.8	8 54.0	108.7	8 20.4	109.5	7 46.6	110.3	7 12.6	111.1	4 50
40	11 29.7	109.2	10 55.5	110.1	10 21.1	110.9	9 46.6	111.7	9 12.0	112.5	40
30	13 30.5	110.6	12 55.6	111.5	12 20.7	112.3	11 45.3	113.1	11 10.0	114.0	30
20	15 30.3	112.1	14 54.7	113.0	14 18.9	113.8	13 43.0	114.6	13 06.9	115.5	20
10	17 28.6	113.7	16 52.4	114.5	16 15.9	115.3	15 39.1	116.1	15 02.1	117.0	10
4 00	19 25.7	115.3	18 48.6	116.1	18 11.3	116.9	17 33.8	117.7	16 56.0	118.6	4 00
3 50	21 21.2	116.9	20 43.2	117.7	20 05.1	118.5	19 26.7	119.3	18 48.0	120.2	3 50
40	23 15.0	118.6	22 36.2	119.4	21 57.1	120.2	21 17.8	121.0	20 38.3	121.9	40
30	25 06.9	120.4	24 27.2	121.2	23 47.2	122.0	23 06.9	122.8	22 26.3	123.6	30
20	26 56.9	122.2	26 16.1	123.0	25 35.1	123.8	24 53.9	124.6	23 12.4	125.4	20
10	28 44.5	124.1	28 02.7	124.9	27 20.8	125.7	26 38.4	126.5	25 55.8	127.3	10
3 00	30 29.7	126.1	29 46.9	126.9	29 03.8	127.7	28 20.4	128.5	27 36.8	129.3	3 00
2 50	32 12.2	128.2	31 28.2	129.0	30 44.1	129.8	29 59.7	130.6	29 14.9	131.3	2 50
40	33 51.8	130.3	33 06.8	131.1	32 21.4	131.9	31 35.8	132.7	30 50.0	133.4	40
30	35 28.2	132.6	34 41.9	133.4	33 55.5	134.2	33 08.6	134.9	32 21.5	135.6	30
20	37 01.0	135.0	36 13.6	135.7	35 25.8	136.5	34 37.9	137.2	33 49.7	138.0	20
10	38 29.9	137.5	37 41.3	138.2	36 52.4	138.9	36 03.2	139.6	35 13.8	140.3	10
2 00	39 54.8	140.1	39 04.9	140.8	38 14.7	141.5	37 24.4	142.2	36 33.7	142.8	2 00
1 50	41 14.9	142.8	40 23.7	143.5	39 32.4	144.2	38 40.8	144.8	37 49.0	145.5	1 50
40	42 30.1	145.6	41 37.8	146.3	40 45.2	146.9	39 52.4	147.5	38 59.4	148.2	40
30	43 39.9	148.6	42 46.4	149.2	41 52.6	149.8	40 58.7	150.4	40 04.6	151.0	30
20	44 44.0	151.7	43 49.2	152.3	42 54.3	152.8	41 59.3	153.4	41 04.1	153.9	20
10	45 41.7	154.9	44 45.9	155.4	43 50.0	155.9	42 53.8	156.4	41 57.7	156.9	10
1 00	46 32.8	158.2	45 36.0	158.7	44 39.1	159.2	43 42.0	159.6	42 44.9	160.0	1 00
0 50	47 16.8	161.7	46 19.1	162.1	45 21.3	162.5	44 23.4	162.8	43 25.4	163.2	0 50
40	47 53.6	165.2	46 55.1	165.6	45 56.5	165.9	44 57.9	166.2	43 59.2	166.5	40
30	48 22.3	168.8	47 23.2	169.1	46 24.0	169.3	45 24.8	169.6	44 25.5	169.8	30
20	48 43.2	172.5	47 43.6	172.7	46 44.0	172.9	45 44.4	173.1	44 44.7	173.2	20
10	48 55.8	176.3	47 55.9	176.3	46 56.0	176.4	45 56.0	176.5	44 56.1	176.6	10
0 00	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 36.0	108.0	0 03.8	108.8							5 20
10	2 37.9	109.3	2 05.1	110.1	1 32.2	110.9	0 59.4	111.8	0 26.6	112.6	10
5 00	4 38.8	110.6	4 05.3	111.4	3 31.8	112.2	2 58.3	113.1	2 24.7	113.9	5 00
4 50	6 38.5	112.0	6 04.4	112.8	5 30.1	113.6	4 55.9	114.4	4 21.6	115.2	4 50
40	8 37.2	113.4	8 02.4	114.2	7 27.5	115.0	6 52.4	115.8	6 17.3	116.6	40
30	10 34.6	114.8	9 58.9	115.6	9 23.1	116.4	8 47.3	117.2	8 11.4	118.0	30
20	12 30.7	116.3	11 54.3	117.1	11 17.7	117.9	10 40.9	118.7	10 04.1	119.5	20
10	14 25.1	117.8	13 47.9	118.6	13 10.5	119.4	12 32.9	120.2	11 55.2	121.0	10
4 00	16 18.1	119.4	15 40.0	120.2	15 01.7	121.0	14 23.2	121.8	13 44.5	122.5	4 00
3 50	18 09.1	121.0	17 30.1	121.8	16 50.9	122.6	16 11.5	123.4	15 31.9	124.1	3 50
40	19 58.6	122.7	19 18.5	123.5	18 38.3	124.2	17 58.0	125.0	17 17.3	125.8	40
30	21 45.7	124.4	21 04.7	125.2	20 23.4	125.9	19 42.1	126.7	19 00.4	127.5	30
20	23 30.6	126.2	22 48.6	127.0	22 06.4	127.7	21 23.9	128.5	20 41.2	129.3	20
10	25 13.1	128.1	24 30.0	128.9	23 46.8	129.6	23 03.2	130.4	22 19.5	131.1	10
3 00	26 52.9	130.0	26 08.8	130.8	25 24.5	131.5	24 39.8	132.3	23 55.0	133.0	3 00
2 50	28 29.9	132.0	27 44.7	132.8	26 59.1	133.5	26 13.4	134.3	25 27.4	135.0	2 50
40	30 03.8	134.2	29 17.5	134.9	28 30.9	135.6	27 44.4	136.3	26 57.0	137.0	40
30	31 34.2	136.4	30 46.7	137.1	29 59.0	137.8	29 11.0	138.5	28 22.7	139.1	30
20	33 01.2	138.7	32 12.5	139.4	31 23.5	140.0	30 34.4	140.7	29 45.0	141.3	20
10	34 24.1	141.0	33 34.2	141.7	32 44.1	142.3	31 53.8	143.0	31 03.2	143.6	10
2 00	35 42.9	143.5	34 51.8	144.2	34 00.5	144.8	33 09.0	145.4	32 17.4	146.0	2 00
1 50	36 57.0	146.1	36 04.8	146.7	35 12.3	147.3	34 19.8	147.9	33 27.0	148.5	1 50
40	38 06.3	148.8	37 12.9	149.3	36 19.4	149.9	35 25.7	150.4	34 31.8	151.0	40
30	39 10.2	151.6	38 15.8	152.1	37 21.2	152.6	36 26.5	153.1	35 31.6	153.6	30
20	40 08.7	154.4	39 13.3	154.9	38 17.7	155.4	37 22.0	155.8	36 26.1	156.3	20
10	41 01.2	157.3	40 04.8	157.8	39 08.3	158.3	38 11.7	158.7	37 14.9	159.1	10
1 00	41 47.6	160.4	40 50.3	160.8	39 53.0	161.2	38 55.4	161.6	37 57.9	161.9	1 00
0 50	42 27.4	163.5	41 29.4	163.9	40 31.1	164.2	39 32.9	164.5	38 34.6	164.8	0 50
40	43 00.5	166.7	42 01.7	167.0	41 02.9	167.3	40 04.0	167.5	39 05.1	167.8	40
30	43 26.4	170.0	42 27.0	170.2	41 27.7	170.4	40 28.3	170.6	39 28.9	170.8	30
20	43 45.0	173.3	42 45.4	173.5	41 45.7	173.6	40 46.2	173.7	39 46.5	173.8	20
10	43 56.2	176.6	42 56.4	176.7	41 56.4	176.8	40 56.4	176.9	39 56.5	176.9	10
0 00	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 51.1	114.8	1 17.5	115.6	0 43.9	116.4	0 10.2	117.2			5 00
4 50	3 47.2	116.1	3 12.8	116.9	2 38.3	117.7	2 03.8	118.5	1 29.2	119.4	4 50
40	5 42.0	117.5	5 06.8	118.3	4 31.4	119.1	3 56.1	119.9	3 20.7	120.7	40
30	7 35.3	118.9	6 59.2	119.7	6 23.1	120.5	5 46.7	121.3	5 10.4	122.1	30
20	9 27.2	120.3	8 50.2	121.1	8 13.1	121.9	7 35.8	122.7	6 58.5	123.5	20
10	11 17.2	121.8	10 39.4	122.6	10 01.3	123.4	9 23.1	124.2	8 44.9	124.9	10
4 00	13 05.7	123.3	12 26.8	124.1	11 47.8	124.9	11 08.6	125.7	10 29.3	126.4	4 00
3 50	14 52.2	124.9	14 12.3	125.7	13 32.2	126.5	12 52.1	127.3	12 11.7	128.0	3 50
40	16 36.6	126.6	15 55.7	127.3	15 14.6	128.1	14 33.4	128.8	13 52.0	129.5	40
30	18 18.7	128.3	17 36.7	129.0	16 54.7	129.8	16 12.3	130.5	15 29.9	131.2	30
20	19 58.4	130.0	19 15.4	130.7	18 32.3	131.5	17 48.9	132.2	17 05.4	133.0	20
10	21 35.6	131.8	20 51.5	132.5	20 07.2	133.3	19 22.7	134.0	18 38.1	134.7	10
3 00	23 10.0	133.7	22 24.8	134.4	21 39.4	135.1	20 53.7	135.8	20 08.0	136.5	3 00
2 50	24 41.4	135.7	23 55.1	136.4	23 08.6	137.1	22 21.8	137.7	21 34.9	138.4	2 50
40	26 09.6	137.7	25 22.2	138.4	24 34.5	139.1	23 46.6	139.7	22 58.6	140.4	40
30	27 34.3	139.8	26 45.7	140.4	25 57.0	141.1	25 08.0	141.7	24 18.9	142.4	30
20	28 55.4	142.0	28 05.7	142.6	27 15.8	143.3	26 25.7	143.9	25 35.5	144.5	20
10	30 12.6	144.3	29 21.7	144.9	28 30.7	145.5	27 39.5	146.1	26 48.2	146.7	10
2 00	31 25.6	146.6	30 33.6	147.2	29 41.5	147.8	28 49.3	148.3	27 56.9	148.9	2 00
1 50	32 34.2	149.0	31 41.1	149.6	30 47.9	150.1	29 54.5	150.6	29 01.2	151.2	1 50
40	33 37.9	151.5	32 43.8	152.0	31 49.6	152.5	30 55.2	153.0	30 00.8	153.5	40
30	34 36.7	154.1	33 41.6	154.6	32 46.4	155.0	31 51.1	155.5	30 55.7	155.9	30
20	35 30.2	156.7	34 34.2	157.2	33 38.1	157.6	32 41.8	158.0	31 45.6	158.4	20
10	36 18.2	159.5	35 21.2	159.9	34 24.3	160.3	33 27.2	160.6	32 30.2	161.0	10
1 00	37 00.2	162.3	36 02.6	162.6	35 04.9	163.0	34 07.1	163.3	33 09.3	163.6	1 00
0 50	37 36.3	165.1	36 37.9	165.4	35 39.7	165.7	34 41.2	166.0	33 42.7	166.3	0 50
40	38 06.2	168.0	37 07.3	168.3	36 08.3	168.5	35 09.3	168.7	34 10.3	168.9	40
30	38 29.6	171.0	37 30.2	171.2	36 30.8	171.3	35 31.3	171.5	34 31.9	171.7	30
20	38 46.5	174.0	37 46.7	174.1	36 47.0	174.2	35 47.2	174.3	34 47.5	174.4	20
10	38 56.7	177.0	37 56.7	177.1	36 56.7	177.1	35 56.8	177.2	34 56.9	177.2	10
0 00	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 00.2	85.3	6 10
6 00	0 00.0	90.0	0 31.8	89.2	1 03.6	88.3	1 35.4	87.5	2 07.1	86.6	6 00
5 50	2 07.3	91.3	2 39.0	90.5	3 10.8	89.6	3 42.5	88.8	4 14.1	87.9	5 50
40	4 14.4	92.7	4 46.2	91.8	5 18.0	91.0	5 49.7	90.1	6 21.3	89.3	40
30	6 21.3	94.0	6 53.2	93.1	7 25.1	92.3	7 56.9	91.4	8 28.5	90.6	30
20	8 28.1	95.3	9 00.3	94.5	9 32.3	93.6	10 04.2	92.8	10 35.8	91.9	20
10	10 34.7	96.7	11 06.9	95.8	11 38.9	94.9	12 11.1	94.1	12 42.8	93.2	10
5 00	12 40.7	98.1	13 13.2	97.2	13 45.6	96.3	14 17.8	95.5	14 49.7	94.6	5 00
4 50	14 46.5	99.5	15 19.2	98.6	15 51.8	97.7	16 24.2	96.9	16 56.4	96.0	4 50
40	16 51.6	100.9	17 24.8	100.0	17 57.6	99.2	18 30.3	98.3	19 02.7	97.4	40
30	18 56.3	102.4	19 29.7	101.5	20 02.9	100.6	20 35.9	99.7	21 08.6	98.8	30
20	21 00.1	103.9	21 34.1	103.0	22 07.7	102.1	22 41.1	101.2	23 14.1	100.3	20
10	23 03.1	105.4	23 37.6	104.5	24 11.6	103.6	24 45.4	102.7	25 18.8	101.8	10
4 00	25 05.4	107.0	25 40.3	106.1	26 14.9	105.2	26 49.2	104.3	27 23.1	103.4	4 00
3 50	27 06.5	108.7	27 41.9	107.8	28 17.1	106.8	28 51.9	105.9	29 26.3	105.0	3 50
40	29 06.4	110.4	29 42.6	109.4	30 18.4	108.5	30 53.8	107.6	31 28.8	106.7	40
30	31 04.9	112.2	31 41.8	111.2	32 18.2	110.3	32 54.4	109.4	33 30.1	108.4	30
20	33 01.9	114.0	33 39.7	113.1	34 17.0	112.1	34 53.9	111.1	35 30.3	110.2	20
10	34 57.3	115.9	35 35.8	115.0	36 14.0	114.0	36 51.8	113.0	37 28.8	112.1	10
3 00	36 50.7	117.9	37 30.2	117.0	38 09.3	116.0	38 47.9	115.0	39 26.0	114.0	3 00
2 50	38 42.0	120.1	39 22.5	119.1	40 02.5	118.1	40 42.2	117.1	41 21.1	116.1	2 50
40	40 30.9	122.3	41 12.5	121.3	41 53.6	120.4	42 34.3	119.4	43 14.3	118.3	40
30	42 17.0	124.6	42 59.8	123.7	43 42.0	122.7	44 23.8	121.7	45 04.9	120.7	30
20	44 00.1	127.1	44 44.1	126.2	45 27.6	125.2	46 10.6	124.2	46 53.0	123.2	20
10	45 39.7	129.8	46 24.9	128.8	47 09.8	127.9	47 54.0	126.9	48 37.8	125.8	10
2 00	47 15.6	132.6	48 02.2	131.6	48 48.3	130.7	49 34.0	129.7	50 19.1	128.6	2 00
1 50	48 47.0	135.6	49 35.1	134.6	50 22.6	133.6	51 09.8	132.7	51 56.4	131.6	1 50
40	50 13.6	138.7	51 03.1	137.8	51 52.2	136.8	52 40.9	135.9	52 29.0	134.9	40
30	51 34.8	142.0	52 25.9	141.1	53 16.5	140.3	54 06.8	139.4	54 56.4	138.4	30
20	52 50.1	145.5	53 42.6	144.7	54 34.7	143.9	55 26.6	143.0	56 17.9	142.1	20
10	53 58.6	149.3	54 52.6	148.5	55 46.2	147.7	56 39.6	146.9	57 32.5	146.0	10
1 00	55 00.0	153.2	55 55.3	152.5	56 50.4	151.8	57 45.3	151.0	58 39.9	150.2	1 00
0 50	55 53.3	157.3	56 49.9	156.7	57 46.2	156.1	58 42.5	155.4	59 38.6	154.7	0 50
40	56 38.0	161.6	57 35.7	161.1	58 33.4	160.6	59 30.9	160.0	60 28.2	159.4	40
30	57 13.4	166.0	58 12.0	165.7	59 10.8	165.3	60 09.4	164.9	61 07.6	164.4	30
20	57 39.1	170.6	58 38.6	170.4	59 38.0	170.1	60 37.4	169.8	61 36.7	169.5	20
10	57 54.8	175.3	58 54.7	175.2	59 54.4	175.0	60 54.3	174.9	61 54.1	174.7	10
0 00	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 01.9	80.6	0 34.0	79.7	6 20
10	0 32.2	84.4	1 04.0	83.6	1 35.8	82.7	2 07.6	81.9	2 39.4	81.0	10
6 00	2 38 8	85.7	3 10.5	84.9	3 42.2	84.1	4 13.8	83.2	4 45.3	82.4	6 00
5 50	4 45.8	87.0	5 17.4	86.2	5 48.9	85.4	6 20.2	84.5	6 51.5	83.7	5 50
40	6 52.9	88.4	7 24.3	87.5	7 55.7	86.7	8 27.0	85.8	8 58.2	84.9	40
30	9 00.0	89.7	9 31.5	88.8	10 02.7	88.0	10 33.9	87.1	11 04.9	86.2	30
20	11 07.4	91.0	11 38.8	90.2	12 10.0	89.3	12 41.1	88.4	13 12.0	87.5	20
10	13 14.4	92.3	13 45.9	91.5	14 17.2	90.6	14 48.3	89.7	15 19.1	88.8	10
5 00	15 21.5	93.7	15 53.0	92.9	16 24.4	92.0	16 55.5	91.1	17 26.4	90.2	5 00
4 50	17 28.3	95.1	18 00.0	94.2	18 31.4	93.3	19 02.6	92.4	19 33.5	91.5	4 50
40	19 34.9	96.5	20 06.7	95.6	20 38.3	94.7	21 09.6	93.8	21 40.6	92.8	40
30	21 41.0	97.9	22 13.2	97.0	22 44.9	96.1	23 16.4	95.2	23 47.5	94.2	30
20	23 46.8	99.4	24 19.2	98.5	24 51.3	97.5	25 23.0	96.6	25 54.4	95.7	20
10	25 51.9	100.9	26 24.8	100.0	26 57.1	99.0	27 29.1	98.1	28 00.7	97.1	10
4 00	27 56.6	102.4	28 29.8	101.5	29 02.5	100.5	29 34.8	99.6	30 06.7	98.6	4 00
3 50	30 00.6	104.0	30 34.1	103.1	31 07.2	102.1	31 40.0	101.1	32 12.3	100.1	3 50
40	32 03.3	105.7	32 37.5	104.7	33 11.2	103.7	33 44.4	102.7	34 17.2	101.7	40
30	34 05.3	107.4	34 40.1	106.4	35 14.4	105.4	35 48.2	104.4	36 21.4	103.4	30
20	36 06.2	109.2	36 41.6	108.2	37 16.5	107.2	37 50.8	106.1	38 24.6	105.1	20
10	38 05.6	111.1	38 41.8	110.0	39 17.3	109.0	39 52.5	108.0	40 27.0	106.9	10
3 00	40 03.5	113.0	40 40.5	112.0	41 17.0	110.9	41 52.8	109.9	42 28.0	108.8	3 00
2 50	41 59.6	115.1	42 37.6	114.1	43 14.9	113.0	43 51.6	111.9	44 27.6	110.8	2 50
40	43 53.8	117.3	44 32.8	116.2	45 11.1	115.1	45 48.8	114.0	46 25.8	112.9	40
30	45 45.6	119.6	46 25.6	118.5	47 05.1	117.4	47 43.9	116.3	48 22.0	115.2	30
20	47 34.8	122.1	48 16.1	121.0	48 56.8	119.9	49 36.7	118.8	50 15.9	117.6	20
10	49 21.0	124.8	50 03.5	123.7	50 45.4	122.5	51 26.8	121.4	52 07.3	120.2	10
2 00	51 03.7	127.6	51 47.7	126.5	52 31.1	125.4	53 13.8	124.2	53 55.7	123.0	2 00
1 50	52 42.4	130.6	53 27.9	129.5	54 12.7	128.4	54 56.9	127.2	55 40.5	126.0	1 50
40	54 16.6	133.9	55 03.7	132.8	55 50.2	131.7	56 36.0	130.5	57 21.2	129.3	40
30	55 45.6	137.4	56 34.5	136.3	57 22.5	135.2	58 10.2	134.0	58 57.1	132.8	30
20	57 08.8	141.1	57 59.3	140.1	58 49.3	139.0	59 38.6	137.9	60 27.4	136.7	20
10	58 25.1	145.1	59 17.4	144.2	60 09.0	143.2	61 00.4	142.1	61 51.1	141.0	10
1 00	59 34.1	149.4	60 27.9	148.5	61 21.5	147.6	62 14.6	146.6	63 07.2	145.6	1 00
0 50	60 34.4	154.0	61 30.0	153.2	62 25.0	152.4	63 20.0	151.5	64 14.5	150.5	0 50
40	61 25.4	158.8	62 22.4	158.2	63 19.2	157.5	64 15.8	156.7	65 12.1	155.9	40
30	62 06.0	163.9	63 04.4	163.3	64 02.4	162.8	65 00.3	162.2	65 58.2	161.6	30
20	62 35.9	169.2	63 35.1	168.8	64 34.2	168.4	65 33.2	168.0	66 32.2	167.5	20
10	62 53.9	174.6	63 53.7	174.4	64 53.5	174.2	65 53.3	174.0	66 53.0	173.8	10
0 00	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30					0 06.6	75.9	0 39.1	75.1	1 11.6	74.2	6 30
20	1 06.1	78.9	1 38.1	78.0	2 10.2	77.2	2 42.3	76.4	3 14.3	75.5	20
10	3 11.2	80.2	3 42.9	79.3	4 14.7	78.5	4 46.2	77.6	5 17.8	76.8	10
6 00	5 16.8	81.5	5 48.2	80.6	6 19.5	79.8	6 50.8	78.9	7 21.9	78.1	6 00
5 50	7 22.9	82.8	7 53.9	81.9	8 25.0	81.1	8 55.9	80.2	9 26.8	79.3	5 50
40	9 29.2	84.1	10 00.1	83.2	10 30.8	82.4	11 01.4	81.5	11 31.9	80.6	40
30	11 35.8	85.4	12 06.5	84.5	12 37.1	83.6	13 07.4	82.7	13 37.7	81.8	30
20	13 42.7	86.7	14 13.3	85.8	14 43.6	84.9	15 13.8	84.0	15 43.7	83.1	20
10	15 49.8	88.0	16 20.2	87.1	16 50.6	86.2	17 20.5	85.3	17 50.1	84.3	10
5 00	17 57.0	89.3	18 27.3	88.4	18 57.4	87.4	19 27.3	86.5	19 56.8	85.6	5 00
4 50	20 04.2	90.6	20 34.5	89.7	21 04.8	88.7	21 34.4	87.8	22 03.8	86.9	4 50
40	22 11.3	91.9	22 41.8	91.0	23 11.8	90.1	23 41.5	89.1	24 10.9	88.2	40
30	24 18.3	93.3	24 48.8	92.3	25 19.0	91.4	25 48.8	90.4	26 18.4	89.5	30
20	26 25.3	94.7	26 55.9	93.7	27 26.1	92.8	27 55.9	91.8	28 25.3	90.8	20
10	28 32.0	96.1	29 02.7	95.1	29 33.2	94.2	30 02.9	93.2	30 32.4	92.1	10
4 00	30 38.2	97.6	31 09.3	96.6	31 39.8	95.6	32 09.9	94.6	32 39.5	93.5	4 00
3 50	32 44.2	99.1	33 15.3	98.1	33 46.3	97.1	34 16.7	96.0	34 46.3	95.0	3 50
40	34 49.4	100.7	35 21.1	99.6	35 52.3	98.6	36 22.9	97.5	36 52.9	96.4	40
30	36 54.1	102.3	37 26.2	101.2	37 57.8	100.2	38 28.8	99.1	38 59.1	98.0	30
20	38 57.9	104.0	39 30.7	102.9	40 02.7	101.8	40 34.1	100.7	41 04.9	99.6	20
10	41 00.8	105.8	41 34.1	104.7	42 06.8	103.6	42 38.8	102.4	43 10.0	101.3	10
3 00	43 02.7	107.7	43 36.7	106.5	44 09.9	105.4	44 42.4	104.2	45 14.3	103.0	3 00
2 50	45 03.2	109.6	45 38.0	108.5	46 12.0	107.3	46 45.2	106.1	47 17.8	104.9	2 50
40	47 02.2	111.7	47 37.9	110.6	48 12.7	109.4	48 46.8	108.1	49 20.1	106.8	40
30	48 59.3	114.0	49 36.2	112.8	50 12.0	111.6	50 47.0	110.3	51 21.2	109.0	30
20	50 54.5	116.4	51 32.3	115.1	52 09.2	113.9	52 45.3	112.6	53 20.6	111.2	20
10	52 47.1	119.0	53 26.3	117.7	54 04.4	116.4	54 41.8	115.1	55 18.2	113.7	10
2 00	54 37.0	121.8	55 17.5	120.5	55 57.0	119.1	56 35.7	117.7	57 13.5	116.3	2 00
1 50	56 23.4	124.8	57 05.4	123.5	57 46.6	122.1	58 26.9	120.7	59 06.1	119.3	1 50
40	58 05.7	128.1	58 49.5	126.8	59 32.3	125.4	60 14.2	124.0	60 55.3	122.5	40
30	59 43.4	131.6	60 28.9	130.3	61 13.9	129.0	61 57.7	127.5	62 40.5	126.0	30
20	61 15.6	135.5	62 03.1	134.2	62 49.8	132.9	63 35.7	131.5	64 20.8	130.0	20
10	62 41.3	139.8	63 30.8	138.5	64 19.8	137.2	65 08.0	135.8	65 55.0	134.4	10
1 00	63 59.5	144.5	64 51.2	143.3	65 42.2	142.0	66 32.5	140.7	67 22.3	139.3	1 00
0 50	65 08.7	149.5	66 02.7	148.4	66 55.8	147.3	67 48.7	146.0	68 40.8	144.7	0 50
40	66 08.1	155.0	67 03.9	154.1	67 59.2	153.1	68 54.1	152.0	69 48.6	150.8	40
30	66 56.0	160.9	67 53.4	160.1	68 50.6	159.3	69 47.8	158.4	70 44.2	157.4	30
20	67 31.2	167.0	68 30.0	166.5	69 28.6	165.9	70 27.3	165.3	71 25.7	164.6	20
10	67 52.7	173.5	68 52.4	173.2	69 52.1	172.9	70 51.7	172.6	71 51.3	172.2	10
0 00	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40			0 15.6	71.2	0 48.6	70.4	1 21.6	69.5	1 54.6	68.7	6 40
30	1 44.0	73.4	2 16.4	72.5	2 41.4	71.7	3 21.1	70.8	3 53.3	70.0	30
20	3 46.2	74.7	4 18.1	73.8	4 50.0	73.0	5 21.8	72.1	5 53.6	71.3	20
10	5 49.2	75.9	6 20.7	75.0	6 52.0	74.2	7 23.2	73.3	7 54.3	72.5	10
6 00	7 53.0	77.2	8 23.9	76.3	8 54.8	75.5	9 25.5	74.6	9 56.1	73.7	6 00
5 50	9 57.3	78.5	10 27.8	77.6	10 58.2	76.7	11 28.5	75.8	11 58.5	74.9	5 50
40	12 02.3	79.7	12 32.4	78.8	13 02.4	77.9	13 32.1	77.0	14 01.7	76.1	40
30	14 07.7	80.9	14 37.4	80.0	15 07.0	79.1	15 36.4	78.2	16 05.5	77.3	30
20	16 13.4	82.2	16 42.9	81.3	17 12.2	80.4	17 41.2	79.4	18 09.9	78.5	20
10	18 19.7	83.4	18 48.8	82.5	19 17.8	81.6	19 46.5	80.6	20 14.8	79.7	10
5 00	20 26.1	84.7	20 55.1	83.7	21 23.8	82.8	21 52.2	81.8	22 20.2	80.9	5 00
4 50	22 33.0	85.9	23 01.8	84.9	23 30.1	84.0	23 58.3	83.0	24 25.9	82.1	4 50
40	24 40.0	87.2	25 08.6	86.2	25 36.9	85.3	26 04.7	84.3	26 32.2	83.3	40
30	26 47.0	88.5	26 15.6	87.5	17 43.7	86.5	18 11.4	85.5	28 38.6	84.5	30
20	28 54.2	89.8	29 22.7	88.8	29 50.7	87.8	30 18.3	86.7	30 45.4	85.7	20
10	31 01.4	91.1	31 29.9	90.1	31 57.8	89.1	32 25.3	88.0	32 52.3	86.9	10
4 00	33 08.7	92.5	33 37.2	91.5	34 05.2	90.4	34 32.6	89.3	34 59.5	88.2	4 00
3 50	35 15.6	93.9	35 44.1	92.8	36 12.4	91.7	36 39.8	90.6	37 06.6	89.5	3 50
40	37 22.4	95.3	37 51.2	94.2	38 19.4	93.1	38 46.9	92.0	39 13.8	90.8	40
30	39 28.8	96.8	39 57.9	95.7	40 26.2	94.6	40 54.0	93.4	41 21.0	92.2	30
20	41 35.0	98.4	42 04.3	97.2	42 33.0	96.1	43 00.9	94.9	43 28.1	93.6	20
10	43 40.7	100.1	44 10.2	98.8	44 39.2	97.6	45 07.6	96.4	45 34.9	95.1	10
3 00	45 45.4	101.8	46 15.6	100.5	46 45.0	99.3	47 13.6	98.0	47 41.4	96.7	3 00
2 50	47 49.5	103.6	48 20.6	102.3	48 50.3	101.0	49 19.4	99.7	49 47.5	98.3	2 50
40	49 52.6	105.5	50 24.1	104.2	50 54.7	102.9	51 24.4	101.5	51 53.1	100.0	40
30	51 54.5	107.6	52 26.9	106.2	52 58.3	104.8	53 28.7	103.4	53 57.9	101.9	30
20	53 54.9	109.8	54 28.2	108.4	55 00.5	106.9	55 31.7	105.5	56 01.9	103.9	20
10	55 53.8	112.2	56 28.2	110.8	57 01.7	109.3	57 33.8	107.7	58 04.9	106.1	10
2 00	57 50.4	114.9	58 26.0	113.3	59 00.6	111.8	59 34.0	110.1	60 06.3	108.4	2 00
1 50	59 44.4	117.7	60 21.5	116.1	60 57.7	114.5	61 32.7	112.8	62 06.0	111.1	1 50
40	61 35.4	120.9	62 14.2	119.3	62 51.8	117.6	63 28.3	115.9	64 03.5	114.0	40
30	63 22.4	124.4	64 03.2	122.8	64 42.8	121.0	65 21.2	119.2	65 58.1	117.3	30
20	65 04.9	128.4	65 47.8	126.7	66 29.5	124.9	67 10.0	123.1	67 49.3	121.1	20
10	66 41.5	132.8	67 26.8	131.1	68 11.0	129.3	68 54.2	127.4	69 35.5	125.4	10
1 00	68 11.2	137.7	68 59.0	136.1	69 45.8	134.3	70 31.7	132.4	71 16.4	130.3	1 00
0 50	69 32.0	143.3	70 22.8	141.7	71 12.5	140.0	72 01.4	138.2	72 49.0	136.1	0 50
40	70 42.7	149.5	71 35.9	148.1	72 28.5	146.5	73 20.6	144.8	74 11.9	142.9	40
30	71 40.7	156.4	72 36.8	155.2	73 32.0	153.9	74 27.0	152.4	75 21.2	150.7	30
20	72 24.0	163.8	73 22.0	163.0	74 19.9	162.0	75 17.6	161.0	76 14.8	159.7	20
10	72 50.9	171.8	73 50.4	171.3	74 49.8	170.8	75 49.2	170.3	76 48.4	169.7	10
0 00	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00							0 17.3	62.8	0 51.7	62.0	7 00
6 50	0 30.1	66.6	1 03.8	65.7	1 37.3	64.9	2 10.9	64.1	2 44.5	63.2	6 50
40	2 27.4	67.9	3 00.4	67.0	3 33.2	66.2	4 06.1	65.4	4 38.9	64.5	40
30	4 25.7	69.2	4 56.8	68.3	5 30.1	67.4	6 02.1	66.6	6 34.2	65.7	30
20	6 25.2	70.4	6 57.1	69.5	7 28.2	68.7	7 59.6	67.8	8 30.8	67.0	20
10	8 25.3	71.6	8 56.3	70.7	9 27.1	69.9	9 57.7	69.0	10 28.2	68.2	10
6 00	10 26.6	72.9	10 56.9	72.0	11 27.1	71.1	11 57.1	70.2	12 26.9	69.3	6 00
5 50	12 28.3	74.0	12 58.2	73.2	13 27.7	72.3	13 57.0	71.4	14 26.2	70.5	5 50
40	14 31.1	75.2	15 00.3	74.3	15 29.3	73.4	15 58.1	72.5	16 26.6	71.6	40
30	16 34.4	76.4	17 03.1	75.5	17 31.5	74.6	17 59.7	73.7	18 27.7	72.7	30
20	18 38.4	77.6	19 06.6	76.7	19 34.5	75.7	20 02.1	74.8	20 29.4	73.8	20
10	20 42.9	78.7	21 10.7	77.8	21 38.2	76.8	22 05.2	75.9	22 32.0	74.9	10
5 00	22 47.9	79.9	23 15.3	79.0	23 42.2	78.0	24 08.9	77.0	24 35.1	76.0	5 00
4 50	24 53.3	81.1	25 20.3	80.1	25 46.9	79.1	26 13.1	78.1	26 38.8	77.1	4 50
40	26 59.2	82.3	27 25.9	81.3	27 52.1	80.3	28 17.8	79.2	28 43.1	78.2	40
30	29 05.5	83.5	29 31.8	82.4	29 57.6	81.4	30 23.0	80.3	30 47.9	79.3	30
20	31 11.9	84.7	31 38.0	83.6	32 03.5	82.5	32 28.6	81.5	32 53.0	80.4	20
10	33 18.7	85.9	33 44.7	84.8	34 09.8	83.7	34 34.6	82.6	34 58.7	81.5	10
4 00	35 25.7	87.1	35 51.4	86.0	36 16.5	84.9	36 40.9	83.7	37 04.7	82 6	4 00
3 50	37 32.7	88.4	37 58.3	87.2	38 23.2	86.1	38 47.4	84.9	39 10.9	83.7	3 50
40	39 40.0	89.7	40 05.5	88.5	40 30.2	87.3	40 54.3	86.1	41 17.5	84.9	40
30	41 47.2	91.0	42 12.7	89.8	42 37.4	88.5	43 01.2	87.3	43 24.3	86.1	30
20	43 54.4	92.4	44 19.9	91.1	44 44.6	89.8	45 08.4	88.5	45 31.3	87.3	20
10	46 01.4	93.8	46 27.0	92.5	46 51.7	91.2	47 15.6	89.8	47 38.4	88.5	10
3 00	48 08.2	95.3	48 34.0	94.0	48 58.9	92.6	49 22.8	91.2	49 45.6	89.8	3 00
2 50	50 14.6	96.9	50 40.8	95.5	51 05.9	94.1	51 29.9	92.6	51 52.7	91.2	2 50
40	52 20.7	98.6	52 47.2	97.1	53 12.7	95.6	53 37.0	94.1	54 00.0	92.6	40
30	54 26.1	100.4	54 53.1	98.9	55 19.1	97.3	55 43.6	95.7	56 06.9	94.1	30
20	56 30.8	102.3	56 58.5	100.7	57 25.0	99.1	57 50.1	97.4	58 13.8	95.7	20
10	58 34.6	104.4	59 03.1	102.7	59 30.2	101.0	59 55.9	99.2	60 20.1	97.4	10
2 00	60 37.1	106.7	61 06.5	104.9	61 34.6	103.1	62 01.2	101.2	62 26.0	99.3	2 00
1 50	62 38.1	109.3	63 08.7	107.4	63 37.9	105.4	64 05.4	103.4	64 31.0	101.3	1 50
40	64 37.1	112.1	65 09.1	110.1	65 39.7	108.1	66 08.6	105.9	66 35.3	103.7	40
30	66 33.6	115.3	67 07.4	113.2	67 39.5	111.0	68 10.0	108.7	68 38.1	106.3	30
20	68 26.7	119.0	69 02.6	116.7	69 36.9	114.4	70 09.3	111.9	70 39.3	109.4	20
10	70 15.7	123.2	70 54.2	120.8	71 31.0	118.4	72 05.5	115.8	72 38.0	113.0	10
1 00	71 59.2	128.1	72 40.5	125.7	73 20.3	123.2	73 58.1	120.4	74 33.1	117.4	1 00
0 50	73 35.0	133.9	74 20.2	131.5	75 03.0	128.9	75 44.2	126.0	76 23.0	122.9	0 50
40	75 01.6	140.8	75 49.9	138.4	76 37.2	135.9	77 22.7	132.9	78 05.5	129.7	40
30	76 14.7	148.9	77 07.2	146.7	77 59.0	144.5	78 48.7	141.7	79 37.2	138.6	30
20	77 11.5	158.3	78 07.6	156.6	79 03.4	154.8	79 58.3	152.6	80 52.0	149.9	20
10	77 47.6	168.8	78 46.6	167.9	79 45.3	166.8	80 43.9	165.6	81 42.1	164.0	10
0 00	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	82 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 07.3	91.3	1 35.4	92.2	1 03.5	93.0	0 31.7	93.9			5 50
40	4 14.4	92.7	3 42.4	93.5	3 10.5	94.4	2 38.5	95.2	2 06.4	96.1	40
30	6 21.3	94.0	5 49.3	94.8	5 17.1	95.7	4 45.1	96.5	4 12.8	97.4	30
20	8 28.1	95.3	7 55.9	96.2	7 23.6	97.1	6 51.3	97.9	6 18.8	98.7	20
10	10 34.7	96.7	10 02.2	97.5	9 29.6	98.4	8 57.1	99.3	8 24.2	100.1	10
5 00	12 40.7	98.1	12 08.1	98.9	11 35.3	99.8	11 02.3	100.7	10 29.2	101.5	5 00
4 50	14 46.5	99.5	14 13.4	100.3	13 40.3	101.2	13 07.0	102.1	12 33.5	102.9	4 50
40	16 51.6	100.9	16 18.3	101.8	15 44.8	102.7	15 11.0	103.5	14 37.1	104.4	40
30	18 56.3	102.4	18 22.5	103.3	17 48.5	104.2	17 14.3	105.0	16 39.9	105.9	30
20	21 00.1	103.9	20 25.9	104.8	19 51.5	105.7	19 16.8	106.5	18 41.8	107.4	20
10	23 03.1	105.4	22 28.5	106.3	21 53.4	107.2	21 18.2	108.1	20 42.7	108.9	10
4 00	25 05.4	107.0	24 30.1	107.9	23 54.5	108.8	23 18.6	109.7	22 42.4	110.5	4 00
3 50	27 06.5	108.7	26 30.6	109.6	25 54.3	110.5	25 17.8	111.3	24 40.9	112.2	3 50
40	29 06.4	110.4	28 29.8	111.3	27 52.9	112.2	27 15.6	113.0	26 38.0	113.9	40
30	31 04.9	112.2	31 27.6	113.1	30 49.8	114.0	29 11.8	114.8	29 33.4	115.7	30
20	33 01.9	114.0	32 23.8	114.9	31 45.3	115.8	31 06.4	116.7	30 27.1	117.6	20
10	34 57.3	115.9	34 18.3	116.8	33 38.9	117.8	32 59.2	118.7	32 18.9	119.6	10
3 00	36 50.7	117.9	36 10.8	118.8	35 30.4	119.8	34 49.7	120.7	34 08.5	121.6	3 00
2 50	38 42.0	120.1	38 01.1	121.0	37 19.6	121.9	36 37.9	122.8	35 55.7	123.7	2 50
40	40 30.9	122.3	39 48.9	123.2	39 06.3	124.1	38 23.4	125.0	37 40.1	125.9	40
30	42 17.0	124.6	41 33.8	125.6	40 50.2	126.5	40 06.2	127.4	39 21.7	128.2	30
20	44 00.1	127.1	43 15.7	128.1	42 30.8	129.0	41 45.5	129.9	40 59.8	130.7	20
10	45 39.7	129.8	44 54.0	130.7	44 07.8	131.6	43 21.3	132.5	42 34.4	133.3	10
2 00	47 15.6	132.6	46 28.6	133.5	45 41.1	134.3	44 53.2	135.2	44 04.9	136.0	2 00
1 50	48 47.0	135.6	47 58.6	136.4	47 09.8	137.2	46 20.6	138.1	45 30.9	138.9	1 50
40	50 13.6	138.7	49 23.8	139.5	48 33.5	140.3	47 42.9	141.1	46 52.0	141.9	40
30	51 34.8	142.0	50 43.6	142.8	49 52.0	143.6	49 00.0	144.4	48 07.6	145.1	30
20	52 50.1	145.5	51 57.3	146.3	51 04.3	147.0	50 10.9	147.8	49 17.3	148.5	20
10	53 58.6	149.3	53 04.6	150.0	52 10.1	150.6	51 15.4	151.3	50 20.5	152.0	10
1 00	55 00.0	153.2	54 04.5	153.9	53 08.7	154.5	52 12.8	155.1	51 16.7	155.6	1 00
0 50	55 53.3	157.3	54 56.6	157.9	53 59.5	158.4	53 02.5	158.9	52 05.4	159.4	0 50
40	56 38.0	161.6	55 40.1	162.1	54 42.1	162.5	53 44.1	163.0	52 45.9	163.4	40
30	57 13.4	166.0	56 14.8	166.4	55 15.9	166.8	54 17.0	167.1	53 18.0	167.4	30
20	57 39.1	170.6	56 39.7	170.9	55 40.3	171.1	54 40.8	171.3	53 41.3	171.6	20
10	57 54.8	175.3	56 55.0	175.4	55 55.1	175.5	54 55.2	175.6	53 55.4	175.7	10
0 00	58 0.0	180.0	57 0.0	180.0	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

28° 23.4

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50											5 50
40	1 34.1	96.9	1 02.3	97.8	0 30.2	98.6					40
30	3 40.4	98.2	3 08.1	99.1	2 35.6	99.9	2 03.3	100.8	1 30.9	101.6	30
20	5 46.2	99.6	5 13.5	100.4	4 40.8	101.2	4 08.0	102.1	3 35.2	102.9	20
10	7 51.3	101.0	7 18.3	101.8	6 45.2	102.6	6 12.1	103.5	5 38.7	104.3	10
5 00	9 56.0	102.3	9 22.5	103.2	8 49.0	104.0	8 15.4	104.9	7 41.7	105.7	5 00
4 50	11 59.9	103.7	11 26.1	104.6	10 52.0	105.4	10 17.9	106.3	9 43.6	107.1	4 50
40	14 03.0	105.2	13 28.6	106.1	12 54.2	106.9	12 19.5	107.8	11 44.8	108.6	40
30	16 05.3	106.7	15 30.5	107.6	14 55.4	108.4	14 20.2	109.3	13 44.8	110.1	30
20	18 06.7	108.2	17 31.2	109.1	16 55.6	109.9	16 19.8	110.8	15 43.8	111.6	20
10	20 06.9	109.7	19 30.9	110.6	18 54.6	111.5	18 18.1	112.3	17 41.3	113.1	10
4 00	22 06.0	111.4	21 29.2	112.2	20 52.2	113.1	20 15.0	113.9	19 37.6	114.7	4 00
3 50	24 03.8	113.1	23 26.4	113.9	22 48.6	114.8	22 10.6	115.6	21 32.4	116.4	3 50
40	26 00.1	114.8	25 21.8	115.6	24 43.3	116.5	24 04.5	117.3	23 25.5	118.1	40
30	28 54.8	116.6	27 15.7	117.4	26 36.3	118.3	25 56.7	119.1	25 16.6	119.9	30
20	29 47.5	118.4	29 07.6	119.3	28 27.3	120.1	27 46.7	121.0	27 05.9	121.8	20
10	31 38.4	120.4	30 57.5	121.3	30 16.1	122.1	29 34.7	122.9	28 52.7	123.7	10
3 00	33 27.0	122.4	32 45.0	123.3	32 02.8	124.1	31 20.2	124.9	30 37.3	125.7	3 00
2 50	35 13.1	124.5	34 30.2	125.4	33 46.7	126.2	33 03.1	127.1	32 19.1	127.9	2 50
40	36 56.4	126.7	36 12.4	127.6	35 27.9	128.4	34 43.2	129.3	33 58.2	130.1	40
30	38 36.8	129.0	37 51.5	129.9	37 06.0	130.7	36 20.1	131.6	35 33.9	132.3	30
20	40 13.8	131.5	39 27.3	132.4	38 40.5	133.2	37 53.4	134.0	37 06.0	134.7	20
10	41 47.1	134.1	40 59.4	134.9	40 11.4	135.7	39 23.1	136.5	38 34.4	137.2	10
2 00	43 16.3	136.8	42 27.4	137.6	41 38.1	138.4	40 48.5	139.1	39 58.7	139.8	2 00
1 50	44 41.0	139.7	43 50.8	140.4	43 00.1	141.2	42 09.3	141.9	41 18.3	142.6	1 50
40	46 00.8	142.7	45 09.2	143.4	44 17.3	144.1	43 25.2	144.8	42 33.0	145.5	40
30	47 15.1	145.8	46 22.2	146.5	45 29.1	147.2	44 35.8	147.8	43 42.3	148.5	30
20	48 23.4	149.1	47 29.3	149.8	46 35.0	150.4	45 40.5	151.0	44 45.8	151.6	20
10	49 25.4	152.6	48 30.1	153.2	47 34.6	153.7	46 39.0	154.3	45 43.2	154.9	10
1 00	50 20.4	156.2	49 24.0	156.7	48 27.4	157.2	47 30.7	157.7	46 33.9	158.2	1 00
0 50	51 08.1	159.9	50 10.7	160.4	49 13.0	160.8	48 15.4	161.2	47 17.6	161.6	0 50
40	51 47.7	163.8	50 49.3	164.1	49 50.9	164.5	48 52.5	164.9	47 54.0	165.2	40
30	52 19.0	167.7	51 20.0	168.0	50 20.9	168.3	49 21.7	168.6	48 22.6	168.8	30
20	52 41.8	171.8	51 42.2	172.0	50 42.6	172.1	49 43.0	172.3	48 43.4	172.5	20
10	52 55.5	175.9	51 55.6	176.0	50 55.6	176.1	49 55.7	176.2	48 55.8	176.3	10
0 00	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

27° 54′8

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 58.4	102.5	0 25.9	103.3							5 30
20	3 02.3	103.8	2 29.4	104.6	1 56.4	105.5	1 23.4	106.3	0 50.4	107.1	20
10	5 05.5	105.2	4 32.1	106.0	3 58.7	106.8	3 25.1	107.6	2 51.7	108.5	10
5 00	7 07.8	106.6	6 33.9	107.4	5 59.9	108.2	5 25.9	109.0	4 51.7	109.9	5 00
4 50	9 09.4	108.0	8 34.9	108.8	8 00.4	109.6	7 25.7	110.4	6 50.9	111.3	4 50
40	11 09.8	109.4	10 34.8	110.2	9 59.6	111.1	9 24.3	111.9	8 48.9	112.7	40
30	13 09.2	110.9	12 33.5	111.7	11 57.7	112.5	11 21.7	113.3	10 45.7	114.2	30
20	15 07.6	112.4	14 31.2	113.2	13 54.6	114.0	13 17.9	114.8	12 41.0	115.7	20
10	17 04.5	114.0	16 27.4	114.8	15 50.1	115.6	15 12.5	116.4	14 34.8	117.2	10
4 00	18 59.9	115.6	18 22.1	116.4	17 44.0	117.2	17 05.7	118.0	16 27.2	118.8	4 00
3 50	20 53.9	117.3	20 15.2	118.1	19 36.2	118.9	18 57.1	119.7	18 17.8	120.5	3 50
40	22 46.1	119.0	22 06.5	119.8	21 26.7	120.6	20 46.7	121.4	20 06.4	122.2	40
30	24 36.5	120.8	23 55.9	121.6	23 15.2	122.4	22 34.2	123.2	21 53.1	124.0	30
20	26 24.7	122.6	25 43.3	123.4	25 01.6	124.2	24 19.7	125.0	23 37.4	125.8	20
10	28 10.6	124.6	27 28.2	125.3	26 45.5	126.1	26 02.6	126.9	25 19.4	127.7	10
3 00	29 54.1	126.6	29 10.7	127.3	28 26.9	128.1	27 42.9	128.9	26 58.6	129.7	3 00
2 50	31 34.9	128.7	30 50.5	129.4	30 05.5	130.2	29 20.4	130.9	28 35.1	131.7	2 50
40	33 12.8	130.9	32 27.1	131.6	31 41.2	132.4	30 55.0	133.1	30 08.5	133.9	40
30	34 47.3	133.1	34 00.6	133.8	33 13.5	134.6	32 26.1	135.3	31 38.6	136.1	30
20	36 18.3	135.5	35 30.4	136.2	34 42.1	137.0	33 53.7	137.7	33 04.9	138.4	20
10	37 45.5	138.0	36 56.5	138.7	36 06.9	139.4	35 17.3	140.1	34 27.4	140.8	10
2 00	39 08.6	140.6	38 18.2	141.3	37 27.6	142.0	36 36.8	142.6	35 45.7	143.3	2 00
1 50	40 27.0	143.3	39 35.5	144.0	38 43.7	144.7	37 51.6	145.3	36 59.4	145.9	1 50
40	41 40.4	146.1	40 47.7	146.8	39 54.8	147.4	39 01.7	148.0	38 08.3	148.6	40
30	42 48.5	149.1	41 54.7	149.7	41 00.6	150.3	40 06.3	150.8	39 12.0	151.4	30
20	43 51.0	152.2	42 56.0	152.7	42 00.8	153.2	41 05.5	153.7	40 10.1	154.3	20
10	44 47.3	155.4	43 51.2	155.8	42 55.0	156.2	41 58.8	156.7	41 02.2	157.3	10
1 00	45 37.0	158.6	44 40.0	159.0	43 42.9	159.4	42 45.7	159.9	41 48.4	160.3	1 00
0 50	46 19.9	162.0	45 22.1	162.4	44 24.0	162.8	43 26.1	163.1	42 28.0	163.5	0 50
40	46 55.5	165.5	45 56.9	165.8	44 58.2	166.1	43 59.5	166.4	43 00.7	166.7	40
30	47 23.5	169.1	46 24.3	169.3	45 25.0	169.5	44 25.8	169.7	43 26.5	169.9	30
20	47 43.7	172.7	46 44.1	172.8	45 44.4	173.0	44 44.8	173.1	43 45.1	173.3	20
10	47 55.9	176.3	46 56.0	176.4	45 56.1	176.5	44 56.1	176.5	43 56.2	176.6	10
0 00	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 17.4	108.0									5 20
10	2 18.0	109.3	1 44.4	110.1	1 10.8	110.9	0 37.1	111.8	0 03.5	112.6	10
5 00	4 17.6	110.7	3 43.3	111.5	3 09.0	112.3	2 34.7	113.1	2 00.4	113.9	5 00
4 50	6 16.0	112.1	5 41.1	112.9	5 06.1	113.7	4 31.1	114.5	3 55.9	115.3	4 50
40	8 13.3	113.5	7 37.7	114.3	7 02.0	115.1	6 26.2	115.9	5 50.3	116.7	40
30	10 09.3	115.0	9 33.0	115.8	8 56.4	116.6	8 19.8	117.4	7 43.2	118.2	30
20	12 04.0	116.5	11 26.8	117.3	10 49.5	118.1	10 12.0	118.9	9 34.5	119.7	20
10	13 57.1	118.0	13 19.1	118.8	12 40.8	119.6	12 02.6	120.4	11 24.2	121.2	10
4 00	15 48.6	119.6	15 09.7	120.4	14 30.7	121.2	13 51.5	122.0	13 12.1	122.8	4 00
3 50	17 38.1	121.3	16 58.4	122.0	16 18.6	122.8	15 38.4	123.6	14 58.2	124.4	3 50
40	19 26.0	123.0	18 45.3	123.7	18 04.4	124.5	17 23.4	125.3	16 42.1	126.1	40
30	21 11.7	124.8	20 30.0	125.5	19 48.1	126.3	19 06.0	127.0	18 23.9	127.8	30
20	22 55.0	126.6	22 12.3	127.3	21 29.5	128.1	20 46.4	128.8	20 03.1	129.5	20
10	24 36.0	128.5	23 52.2	129.2	23 08.3	130.0	22 24.2	130.7	21 40.0	131.4	10
3 00	26 14.1	130.4	25 29.4	131.2	24 44.5	131.9	23 59.3	132.6	23 14.0	133.3	3 00
2 50	27 49.6	132.4	27 03.8	133.2	26 17.8	133.9	25 31.4	134.6	24 45.0	135.3	2 50
40	29 21.8	134.6	28 34.9	135.3	27 47.8	136.0	27 00.4	136.7	26 12.9	137.4	40
30	30 50.8	136.8	30 02.7	137.4	29 14.4	138.1	28 25.8	138.8	27 37.2	139.5	30
20	32 16.0	139.1	31 26.8	139.7	30 37.4	140.4	29 47.8	141.1	28 58.0	141.7	20
10	33 37.3	141.5	32 47.1	142.1	31 56.5	142.7	31 05.7	143.4	30 14.9	144.0	10
2 00	34 54.4	143.9	34 02.9	144.6	33 11.3	145.2	32 19.5	145.8	31 27.5	146.4	2 00
1 50	36 07.0	146.5	35 14.5	147.1	34 21.8	147.7	33 28.8	148.2	32 35.8	148.8	1 50
40	37 14.8	149.2	36 21.1	149.7	35 27.3	150.3	34 33.3	150.8	33 39.2	151.3	40
30	38 17.4	151.9	37 22.8	152.4	36 27.8	152.9	35 32.8	153.4	34 37.8	153.9	30
20	39 14.5	154.8	38 18.8	155.2	37 23.0	155.7	36 27.1	156.2	35 31.0	156.6	20
10	40 05.5	157.7	39 09.2	158.1	38 12.5	158.5	37 15.8	159.0	36 18.8	159.4	10
1 00	40 51.0	160.7	39 53.6	161.1	38 56.1	161.4	37 58.4	161.8	37 00.7	162.2	1 00
0 50	41 29.8	163.8	40 31.7	164.1	39 33.4	164.4	38 35.0	164.7	37 36.7	165.0	0 50
40	42 01.9	167.0	41 03.1	167.2	40 04.3	167.5	39 05.4	167.7	38 06.4	168.0	40
30	42 27.2	170.2	41 28.0	170.4	40 28.5	170.6	39 29.1	170.8	38 29.7	170.9	30
20	42 45.4	173.4	41 45.7	173.6	40 46.0	173.7	39 46.3	173.8	38 46.6	173.9	20
10	42 56.3	176.7	41 56.4	176.8	40 56.5	176.8	39 56.6	176.9	38 56.7	177.0	10
0 00	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 26.0	114.8	0 51.6	115.6	0 17.2	116.4					5 00
4 50	3 20.8	116.1	2 45.7	116.9	2 10.4	117.7	1 35.2	118.6	0 59.9	119.4	4 50
40	5 14.3	117.5	4 38.3	118.3	4 02.2	119.1	3 26.1	119.9	2 50.0	120.7	40
30	7 06.4	119.0	6 29.6	119.8	5 52.6	120.5	5 15.7	121.3	4 38.7	122.1	30
20	8 56.8	120.5	8 19.1	121.3	7 41.3	122.0	7 03.4	122.8	6 25.4	123.6	20
10	10 45.7	122.0	10 07.1	122.8	9 28.2	123.5	8 49.4	124.3	8 10.5	125.1	10
4 00	12 32.6	123.5	11 53.0	124.3	11 13.4	125.1	10 33.6	125.8	9 53.6	126.6	4 00
3 50	14 17.7	125.1	13 37.2	125.9	12 56.2	126.7	12 15.7	127.4	11 34.7	128.2	3 50
40	16 00.7	126.8	15 19.2	127.5	14 37.5	128.3	13 55.7	129.0	13 13.7	129.8	40
30	17 41.4	128.5	16 58.9	129.2	16 16.2	130.0	15 33.3	130.7	14 50.3	131.5	30
20	19 19.7	130.3	18 36.1	131.0	17 52.4	131.7	17 08.5	132.5	16 24.4	133.2	20
10	20 55.5	132.1	20 10.8	132.8	19 26.0	133.5	18 41.0	134.3	17 55.8	135.0	10
3 00	22 28.4	134.0	21 42.7	134.7	20 56.7	135.4	20 10.6	136.1	19 24.4	136.8	3 00
2 50	23 58.2	136.0	23 11.6	136.7	22 24.5	137.3	21 37.3	138.0	20 50.0	138.7	2 50
40	25 25.1	138.0	24 37.2	138.7	23 49.0	139.3	23 00.7	140.0	22 12.3	140.6	40
30	26 48.4	140.1	25 59.3	140.8	25 10.2	141.4	24 20.8	142.0	23 31.3	142.6	30
20	28 08.0	142.3	27 17.9	142.9	26 27.6	143.6	25 37.2	144.2	24 46.6	144.7	20
10	29 23.8	144.6	28 32.7	145.2	27 41.2	145.8	26 49.7	146.4	25 58.1	146.9	10
2 00	30 35.4	146.9	29 43.1	147.5	28 50.7	148.1	27 58.1	148.6	27 05.4	149.2	2 00
1 50	31 42.6	149.3	30 49.2	149.9	29 55.8	150.4	29 02.2	150.9	28 08.5	151.5	1 50
40	32 45.0	151.8	31 50.7	152.3	30 56.2	152.8	30 01.7	153.3	29 07.0	153.8	40
30	33 42.7	154.4	32 47.3	154.9	31 51.9	155.3	30 56.5	155.8	30 00.8	156.2	30
20	34 34.9	157.0	33 38.7	157.5	32 42.5	157.9	31 46.1	158.3	30 49.7	158.7	20
10	35 21.8	159.7	34 24.9	160.1	33 27.7	160.5	32 30.6	160.8	31 33.5	161.2	10
1 00	36 03.0	162.5	35 05.3	162.8	34 07.5	163.2	33 09.6	163.5	32 11.7	163.8	1 00
0 50	36 38.2	165.3	35 40.0	165.6	34 41.4	165.9	33 43.0	166.2	32 44.4	166.4	0 50
40	37 07.5	168.2	36 08.5	168.4	35 09.5	168.7	34 10.4	168.9	33 11.3	169.1	40
30	37 30.3	171.1	36 30.9	171.3	35 31.5	171.4	34 32.1	171.6	33 32.7	171.8	30
20	37 46.8	174.1	36 47.0	174.2	35 47.3	174.3	34 47.5	174.4	33 47.7	174.5	20
10	37 56.7	177.0	36 56.7	177.1	35 56.8	177.1	34 56.9	177.2	33 57.0	177.2	10
0 00	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 05.2	85.3	6 10
6 00	0 00.0	90.0	0 32.7	89.2	1 05.4	88.3	1 38.0	87.5	2 10.6	86.7	6 00
5 50	2 05.8	91.3	2 38.5	90.5	3 10.1	89.7	3 43.8	88.8	4 16.2	88.0	5 50
40	4 11.5	92.7	4 44.3	91.9	5 17.0	91.2	5 49.6	90.2	6 22.1	89.4	40
30	6 17.1	94.1	6 49.9	93.3	7 22.6	92.6	7 55.4	91.6	8 27.9	90.8	30
20	8 22.4	95.5	8 55.5	94.6	9 28.4	94.0	10 01.1	92.9	10 33.7	92.1	20
10	10 27.5	96.9	11 00.7	96.0	11 33.6	95.4	12 06.6	94.3	12 39.3	93.5	10
5 00	12 32.2	98.3	13 05.6	97.4	13 38.8	96.8	14 11.9	95.7	14 44.8	94.9	5 00
4 50	14 36.4	99.7	15 10.1	98.8	15 43.6	98.2	16 16.9	97.2	16 50.0	96.3	4 50
40	16 40.1	101.2	17 14.2	100.3	17 47.9	99.7	18 21.5	98.6	18 54.8	97.7	40
30	18 43.2	102.7	19 17.4	101.8	19 51.7	101.1	20 25.6	101.1	20 59.2	99.2	30
20	20 45.5	104.2	21 20.4	103.4	21 54.9	102.5	22 29.2	101.6	23 03.1	100.7	20
10	22 47.0	105.8	23 22.3	105.0	23 57.2	104.1	24 32.0	103.2	24 06.4	102.3	10
4 00	24 47.6	107.5	25 23.4	106.6	25 58.9	105.7	26 34.2	104.8	27 09.0	103.9	4 00
3 50	26 47.0	109.2	27 23.4	108.3	27 59.5	107.4	28 35.2	106.4	29 10.6	105.5	3 50
40	28 45.2	110.9	29 22.4	110.0	29 59.1	109.1	30 35.4	108.1	31 11.3	107.2	40
30	30 42.0	112.7	31 19.9	111.8	31 57.2	110.9	32 34.3	109.9	33 10.9	109.0	30
20	32 37.3	114.6	33 15.9	113.6	33 54.1	112.7	34 31.9	111.8	35 09.2	110.8	20
10	34 30.8	116.6	35 10.2	115.6	35 49.2	114.7	36 27.9	113.7	37 06.1	112.8	10
3 00	36 22.3	118.6	37 02.7	117.6	37 42.7	116.7	38 22.1	115.8	39 01.1	114.8	3 00
2 50	38 11.6	120.8	38 53.0	119.8	39 33.9	118.8	40 14.3	117.9	40 54.3	116.9	2 50
40	39 58.5	123.0	40 41.0	122.1	41 22.9	121.1	42 04.5	120.2	42 45.5	119.2	40
30	41 42.6	125.4	42 26.2	124.5	43 09.2	123.5	43 51.8	122.5	44 34.0	121.5	30
20	43 23.6	127.9	44 08.3	127.0	44 52.7	126.0	45 36.5	125.0	46 19.8	124.0	20
10	45 01.0	130.5	45 47.1	129.6	46 32.6	128.7	47 17.8	127.7	48 02.3	126.7	10
2 00	46 34.6	133.3	47 22.0	132.4	48 08.9	131.5	48 55.4	130.5	49 41.3	129.6	2 00
1 50	48 03.9	136.3	48 52.6	135.4	49 40.9	134.5	50 28.8	133.5	51 16.2	132.6	1 50
40	49 28.3	139.4	50 18.4	138.6	51 08.2	137.7	51 57.5	136.8	52 46.4	135.8	40
30	50 47.3	142.8	51 38.8	142.0	52 30.0	141 1	53 20.8	140.2	54 11.2	139.3	30
20	52 00.4	146.3	52 53.4	145.5	53 46.0	144.7	54 38.4	143.8	55 30.3	142.9	20
10	53 06.8	149.9	54 01.2	149.2	54 55.2	148.5	55 49.1	147.7	56 42.6	146.9	10
1 00	54 06.3	153.8	55 01.9	153 2	55 57.4	152.5	56 52.6	151.8	57 47.5	151.0	1 00
0 50	54 57.8	157.8	55 54.6	157.3	56 51.2	156.7	57 47.8	156.1	58 44.1	155.4	0 50
40	55 41.0	162.1	56 38.9	161.6	57 36.7	161.1	58 34.4	160.6	59 31.9	160.0	40
30	56 15.2	166.4	57 13.9	166.0	58 12.6	165.6	59 11.2	165.2	60 09.9	164.8	30
20	56 39.9	170.9	57 39.5	170.6	58 38.9	170.4	59 38.3	170.1	60 37.7	169.8	20
10	56 55.0	175.4	57 54.9	175.3	58 54.7	175.1	59 54.5	175.0	60 54.4	174.9	10
0 00	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 11.8	80.6	0 44.7	79.8	6 20
10	0 37.9	84.5	1 10.7	83.6	1 43.4	82.8	2 16.1	81.9	2 48.8	81.1	10
6 00	2 43.2	85.8	3 15.8	84.9	3 48.4	84.1	4 20.8	83.2	4 53.2	82.4	6 00
5 50	4 48.8	87.1	5 21.2	86.3	5 53.7	85.5	6 25.9	84.6	6 58.1	83.8	5 50
40	6 54.5	88.5	7 26.8	87.7	7 59.1	86.8	8 31.3	86.0	9 03.4	85.1	40
30	9 00.2	89.9	9 32.6	89.0	10 04.9	88.1	10 36.8	87.3	11 08.7	86.4	30
20	11 06.2	91.2	11 38.5	90.4	12 10.6	89.5	12 42.6	88.6	13 14.5	87.8	20
10	13 11.8	92.6	13 44.2	91.7	14 16.4	90.9	14 48.4	90.0	15 20.2	89.1	10
5 00	15 17.4	94.0	15 49.9	93.1	16 22.2	92.3	16 54.2	91.4	17 26.0	90.5	5 00
4 50	17 22.8	95.4	17 55.4	94.5	18 27.7	93.7	19 00.0	92.8	19 31.7	91.6	4 50
40	19 27.9	96.8	20 00.7	96.0	20 33.3	95.1	21 05.5	94.2	21 37.4	93.3	40
30	21 32.6	98.3	22 05.6	97.4	22 38.4	96.5	23 10.7	95.6	23 42.9	94.7	30
20	23 36.8	99.8	24 10.1	98.9	24 43.2	98.0	25 15.8	97.1	25 48.2	96.1	20
10	25 40.4	101.3	26 14.1	100.4	26 47.5	99.5	27 20.3	98.6	27 53.0	97.6	10
4 00	27 43.5	102.9	28 17.6	102.0	28 51.3	101.1	29 24.5	100.1	29 57.4	99.1	4 00
3 50	29 45.6	104.6	30 20.2	103.6	30 54.4	102.7	31 28.1	101.7	32 01.4	100.7	3 50
40	31 46.8	106.3	32 22.0	105.3	32 56.6	104.3	33 30.8	103.4	34 04.6	102.4	40
30	33 47.1	108.1	34 22.8	107.1	34 58.2	106.1	35 32.8	105.1	36 07.1	104.1	30
20	35 46.1	109.9	36 22.5	108.9	36 58.4	107.9	37 33.8	106.9	38 08.6	105.8	20
10	37 43.6	111.8	38 20.8	110.8	38 57.5	109.8	39 33.5	108.8	40 09.1	107.7	10
3 00	39 39.6	113.8	40 17.6	112.8	40 55.1	111.8	41 32.0	110.7	42 08.3	109.6	3 00
2 50	41 33.8	115.9	42 12.7	114.9	42 51.1	113.9	43 28.9	112.8	44 06.0	111.7	2 50
40	43 25.9	118.1	44 05.8	117.1	44 45.1	116.1	45 23.8	115.0	46 02.0	113.9	40
30	45 15.5	120.5	45 56.6	119.5	46 37.0	118.4	47 16.8	117.3	47 56.1	116.2	30
20	47 02.5	123.0	47 44.7	122.0	48 26.2	120.9	49 07.3	119.8	49 47.6	118.6	20
10	48 46.4	125.7	49 29.9	124.7	50 12.9	123.6	50 55.0	122.5	51 36.6	121.3	10
2 00	50 26.7	128.6	51 11.6	127.5	51 55.9	126.4	52 39.6	125.3	53 22.6	124.1	2 00
1 50	52 03.0	131.6	52 49.3	130.5	53 35.1	129.5	54 20.2	128.4	55 04.7	127.2	1 50
40	53 34.7	134.8	54 22.6	133.8	55 09.9	132.8	55 56.6	131.7	56 42.7	130.5	40
30	55 01.1	138.3	55 50.8	137.3	56 40.1	136.3	57 28.0	135.2	58 16.0	134.1	30
20	56 21.8	142.0	57 12.9	141.1	58 03.6	140.1	58 53.7	139.0	59 43.3	138.0	20
10	57 35.8	146.0	58 28.4	145.1	59 20.9	144.2	60 12.7	143.2	61 04.1	142.1	10
1 00	58 42.2	150.2	59 36.5	149.4	60 30.5	148.5	61 24.2	147.6	62 17.4	146.6	1 00
0 50	59 40.2	154.7	60 36.2	154.0	61 31.9	153.2	62 27.0	152.4	63 22.0	151.5	0 50
40	60 29.3	159.4	61 26.5	158.8	62 23.6	158.2	63 20.5	157.5	64 17.1	156.7	40
30	61 08.2	164.4	62 06.8	163.9	63 05.2	163.4	64 03.2	162.8	65 01.2	162.2	30
20	61 36.9	169.5	62 36.2	169.1	63 35.4	168.8	64 34.5	168.4	65 33.6	168.0	20
10	61 54.2	174.7	62 54.0	174.5	63 53.8	174.4	64 53.6	174.2	65 53.3	174.0	10
0 00	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30					0 21.2	75.9	0 54.6	75.1	1 27.9	74.2	6 30
20	1 17.7	78.9	1 50.6	78.1	2 23.5	77.3	2 56.4	76.4	3 29.3	75.6	20
10	3 21.4	80.3	3 53.9	79.4	4 26.6	78.6	4 59.1	77.7	5 26.1	76.9	10
6 00	5 25.6	81.6	5 57.9	80.7	6 30.1	79.9	7 02.3	79.0	7 34.3	78.2	6 00
5 50	7 30.3	82.9	8 02.3	82.0	8 34.2	81.2	9 06.1	80.3	9 37.7	79.5	5 50
40	9 35.3	84.2	10 07.1	83.4	10 38.7	82.5	11 10.3	81.6	11 41.7	80.8	40
30	11 40.6	85.6	12 12.5	84.7	12 43.7	83.8	13 14.9	82.9	13 46.1	82.1	30
20	13 46.1	86.9	14 17.6	86.0	14 48.8	85.1	15 19.9	84.2	15 50.8	83.4	20
10	15 51.9	88.2	16 23.2	87.3	16 54.4	86.4	17 25.3	85.5	17 56.0	84.7	10
5 00	17 57.5	89.6	18 28.8	88.7	18 59.9	87.8	19 30.7	86.9	20 01.2	86.0	5 00
4 50	20 03.3	90.9	20 34.7	90.0	21 05.8	89.1	21 36.5	88.2	22 06.9	87.3	4 50
40	22 09.1	92.3	22 40.5	91.4	23 11.5	90.5	23 42.2	89.6	24 12.6	88.6	40
30	24 14.7	93.7	24 46.2	92.8	25 17.3	91.9	25 48.0	90.9	26 18.3	89.9	30
20	26 20.1	95.2	26 51.7	94.2	27 22.9	93.3	27 53.7	92.3	28 24.2	91.3	20
10	28 25.2	96.7	28 57.1	95.7	29 28.4	94.7	29 59.4	93.7	30 29.8	92.7	10
4 00	30 30.0	98.2	31 02.1	97.2	31 33.8	96.2	32 04.8	95.2	32 35.4	94.2	4 00
3 50	32 34.3	99.8	33 06.7	98.7	33 38.5	97.7	34 09.9	96.7	34 40.8	95.7	3 50
40	34 37.9	101.4	35 10.7	100.3	35 43.0	99.3	36 14.7	98.3	36 45.8	97.2	40
30	36 40.9	103.1	37 14.1	102.0	37 46.8	100.9	38 29.0	99.9	38 50.3	98.8	30
20	38 43.0	104.8	39 16.8	103.7	39 50.0	102.6	40 22.5	101.5	40 54.5	100.4	20
10	40 44.2	106.7	41 18.5	105.5	41 52.3	104.4	42 25.5	103.3	42 57.8	102.2	10
3 00	42 44.0	108.6	43 19.1	107.4	43 53.6	106.3	44 27.3	105.2	45 00.3	104.0	3 00
2 50	44 42.6	110.6	45 18.5	109.5	45 53.7	108.3	46 28.2	107.1	47 01.9	105.9	2 50
40	46 39.5	112.7	47 16.3	111.6	47 52.3	110.4	48 27.6	109.2	49 02.2	108.0	40
30	48 34.5	115.0	49 12.3	113.8	49 49.4	112.6	50 25.7	111.4	51 01.1	110.1	30
20	50 27.3	117.5	51 06.3	116.3	51 44.4	115.0	52 21.7	113.8	52 58.4	112.5	20
10	52 17.6	120.1	52 57.9	118.9	53 37.3	117.6	54 15.9	116.3	54 53.6	115.0	10
2 00	54 04.9	122.9	54 46.6	121.7	55 27.3	120.4	56 07.2	119.1	56 46.3	117.7	2 00
1 50	55 48.6	126.0	56 31.7	124.7	57 14.0	123.4	57 55.5	122.1	58 36.2	120.7	1 50
40	57 28.2	129.3	58 13.1	128.0	58 57.0	126.7	59 40.2	125.4	60 22.5	124.0	40
30	59 03.0	132.9	59 49.7	131.6	60 35.4	130.3	61 20.5	128.9	62 04.7	127.5	30
20	60 32.4	136.8	61 20.8	135.6	62 08.5	134.3	62 55.4	132.9	63 41.7	131.5	20
10	61 55.1	141.0	62 45.4	139.8	63 35.3	138.6	64 24.4	137.3	65 12.8	135.9	10
1 00	63 10.3	145.6	64 02.7	144.5	64 54.5	143.4	65 45.7	142.2	66 36.4	140.8	1 00
0 50	64 16.7	150.6	65 11.0	149.6	66 05.0	148.5	66 58.5	147.3	67 51.2	146.1	0 50
40	65 13.5	155.9	66 09.7	155.0	67 05.4	154.1	68 00.9	153.1	68 56.0	152.0	40
30	65 59.2	161.6	66 56.7	160.9	67 54.4	160.2	68 51.8	159.4	69 48.8	158.5	30
20	66 32.7	167.6	67 31.6	167.1	68 30.4	166.5	69 29.2	166.0	70 27.8	165.4	20
10	66 53.1	173.7	67 52.8	173.5	68 52.5	173.2	69 52.2	172.9	70 51.8	172.6	10
0 00	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 19.5	67.4	6 50
40	0 01.1	72.0	0 34.9	71.2	1 08.7	70.4	1 42.5	69.6	2 16.3	68.7	40
30	2 01.1	73.4	2 34.4	72.5	3 07.7	71.7	3 40.8	70.9	4 14.0	70.0	30
20	4 02.0	74.7	4 34.8	73.9	5 07.6	73.1	5 40.2	72.2	6 12.8	71.3	20
10	6 03.8	76.0	6 36.1	75.2	7 06.1	74.3	7 40.3	73.5	8 12.3	72.6	10
6 00	8 06.2	77.3	8 38.0	76.5	9 09.8	75.6	9 41.4	74.8	10 12.8	73.9	6 00
5 50	10 09.4	78.6	10 40.7	77.8	11 11.9	76.9	11 43.1	76.1	12 14.1	75.2	5 50
40	12 12.9	79.9	12 43.9	79.0	13 14.8	78.1	13 45.5	77.3	14 16.0	76.4	40
30	14 17.0	81.2	14 47.7	80.3	15 18.1	79.4	15 48.4	78.5	16 18.6	77.6	30
20	16 21.5	82.5	16 51.9	81.6	17 22.1	80.7	17 52.1	79.8	18 21.8	78.8	20
10	18 26.4	83.8	18 56.5	82.8	19 26.5	81.9	19 56.1	81.0	20 25.4	80.1	10
5 00	20 31.5	85.1	21 01.5	84.1	21 31.2	83.2	22 00.5	82.2	22 29.6	81.3	5 00
4 50	22 37.0	86.3	23 06.8	85.4	23 36.1	84.4	24 05.1	83.5	24 34.1	82.5	4 50
40	24 42.7	87.6	25 12.3	86.7	25 41.6	85.7	26 10.5	84.8	26 39.0	83.8	40
30	26 48.4	89.0	27 17.9	88.0	27 47.1	87.0	28 15.8	86.0	28 44.2	85.0	30
20	28 54.1	90.4	29 23.7	89.4	29 52.7	88.3	30 21.4	87.3	30 49.6	86.3	20
10	30 59.9	91.7	31 29.4	90.7	31 58.6	89.7	32 27.1	88.6	32 55.2	87.6	10
4 00	33 05.7	93.1	33 35.3	92.1	34 04.4	91.1	34 33.0	90.0	35 01.0	88.9	4 00
3 50	35 11.1	94.6	35 40.9	93.5	36 10.1	92.5	36 38.8	91.4	37 06.8	90.3	3 50
40	37 16.4	96.1	37 46.4	95.0	38 15.8	93.9	38 44.5	92.8	39 12.5	91.7	40
30	39 21.2	97.7	39 51.5	96.5	40 21.1	95.4	40 50.0	94.3	41 18.2	93.1	30
20	41 25.7	99.3	41 56.3	98.1	42 26.2	97.0	42 55.4	95.8	43 23.8	94.6	20
10	43 29.6	101.0	44 00.6	99.8	44 30.8	98.6	45 00.2	97.4	45 29.1	96.1	10
3 00	45 32.7	102.8	46 04.2	101.6	46 34.8	100.3	47 04.8	99.1	47 33.9	97.8	3 00
2 50	47 34.8	104.7	48 06.9	103.5	48 38.2	102.2	49 08.7	100.9	49 38.2	99.5	2 50
40	49 36.0	106.7	50 08.8	105.4	50 40.8	104.1	51 11.9	102.7	51 42.0	101.3	40
30	51 35.8	108.8	52 09.5	107.5	52 42.2	106.1	53 14.0	104.7	53 44.9	103.3	30
20	53 34.0	111.1	54 08.7	109.7	54 42.4	108.3	55 15.1	106.9	55 46.8	105.3	20
10	55 30.5	113.6	56 06.1	112.2	56 41.1	110.7	57 14.8	109.2	57 47.5	107.6	10
2 00	57 24.5	116.3	58 01.6	114.8	58 37.7	113.3	59 12.6	111.7	59 46.6	110.1	2 00
1 50	59 15.8	119.2	59 54.5	117.7	60 32.0	116.1	61 08.4	114.5	61 43.6	112.8	1 50
40	61 03.9	122.5	61 44.2	120.9	62 23.3	119.3	63 01.4	117.6	63 38.3	115.8	40
30	62 47.9	126.0	63 30.0	124.5	64 11.0	122.9	64 51.0	121.1	65 29.7	119.3	30
20	64 27.1	130.0	65 11.3	128.4	65 54.5	126.7	66 36.6	125.0	67 17.5	123.1	20
10	66 00.2	134.4	66 46.8	132.9	67 32.4	131.2	68 16.8	129.4	69 00.2	127.5	10
1 00	67 26.3	139.3	68 15.3	137.8	69 03.3	136.1	69 50.5	134.4	70 36.7	132.5	1 00
0 50	68 43.7	144.8	69 35.2	143.4	70 26.0	141.8	71 16.0	140.1	72 04.7	138.3	0 50
40	69 50.7	150.9	70 44.7	149.6	71 38.2	148.2	72 31.1	146.6	73 23.4	144.9	40
30	70 45.2	157.5	71 41.8	156.5	72 37.8	155.3	73 33.5	153.9	74 28.5	152.5	30
20	71 26.3	164.7	72 24.6	163.9	73 22.7	163.1	74 20.5	162.1	75 18.3	161.0	20
10	71 51.4	172.2	72 51.0	171.8	73 50.5	171.4	74 50.0	170.9	75 49.3	170.3	10
0 00	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00					0 09.5	63.6	0 44.7	62.8	1 19.9	62.0	7 00
6 50	0 53.9	66.6	1 28.4	65.8	2 02.8	64.9	2 37.2	64.1	3 11.6	63.3	6 50
40	2 50.0	67.9	3 23.7	67.1	3 57.4	66.2	4 31.1	65.4	5 04.7	64.6	40
30	4 47.1	69.2	5 20.1	68.4	5 53.3	67.5	6 25.9	66.7	6 58.8	65.9	30
20	6 45.3	70.5	7 17.7	69.7	7 49.9	68.8	8 22.1	68.0	8 54.2	67.1	20
10	8 44.2	71.8	9 16.1	70.9	9 47.6	70.0	10 19.1	69.2	10 50.5	68.3	10
6 00	10 44.2	73.1	10 15.4	72.2	11 46.4	71.3	11 17.3	70.4	12 48.0	69.5	6 00
5 50	12 44.8	74.3	13 15.4	73.4	13 45.8	72.5	14 16.1	71.6	14 46.2	70.7	5 50
40	14 46.3	75.5	15 16.4	74.6	15 46.3	73.7	16 16.0	72.8	16 45.4	71.9	40
30	16 48.3	76.7	17 18.0	75.8	17 47.3	74.9	18 16.4	74.0	18 45.3	73.1	30
20	18 51.2	77.9	19 20.3	77.0	19 49.2	76.1	20 17.7	75.1	20 46.0	74.2	20
10	20 54.3	79.1	21 23.1	78.2	21 51.5	77.2	22 19.7	76.3	22 47.3	75.3	10
5 00	22 58.2	80.3	23 26.6	79.4	23 54.5	78.4	24 22.2	77.5	24 49.4	76.4	5 00
4 50	25 02.3	81.5	25 30.4	80.6	25 58.0	79.6	26 25.2	78.6	26 51.9	77.6	4 50
40	27 07.1	82.8	27 34.8	81.8	28 02.0	80.8	28 28.8	79.7	28 55.1	78.7	40
30	29 12.0	84.0	29 39.4	83.0	30 06.2	82.0	30 32.7	80.9	30 58.7	79.9	30
20	31 17.2	85.3	31 44.4	84.2	32 11.0	83.2	32 37.2	82.1	33 02.7	81.0	20
10	33 22.7	86.5	33 49.7	85.4	34 16.2	84.4	34 41.9	83.3	35 07.2	82.2	10
4 00	35 28.4	87.8	35 55.2	86.7	36 21.5	85.6	36 47.1	84.5	37 12.1	83.4	4 00
3 50	37 34.1	89.1	38 00.8	88.0	38 26.9	86.9	38 52.4	85.7	39 17.1	84.6	3 50
40	39 39.9	90.5	40 06.7	89.3	40 32.7	88.2	40 58.0	87.0	41 22.5	85.8	40
30	41 45.7	91.9	42 12.6	90.7	42 38.4	89.5	43 13.6	88.2	43 28.0	87.0	30
20	43 51.4	93.4	44 18.3	92.1	44 44.3	90.8	45 09.5	89.5	45 33.8	88.3	20
10	45 57.0	94.9	46 23.8	93.6	46 50.0	92.3	47 15.2	90.9	47 39.5	89.6	10
3 00	48 02.0	96.5	48 29.2	95.1	48 55.6	93.8	49 21.0	92.4	49 45.3	91.0	3 00
2 50	50 06.8	98.2	50 34.4	96.7	51 01.0	95.3	51 26.4	93.9	51 50.9	92.4	2 50
40	52 11.1	99.9	52 39.1	98.4	53 06.1	96.9	53 32.1	95.4	53 56.7	93.9	40
30	54 14.6	101.8	54 43.2	100.3	55 10.6	98.7	55 36.9	97.1	56 01.9	95.6	30
20	56 17.3	103.8	56 46.6	102.2	57 14.8	100.6	57 41.7	98.9	58 07.2	97.3	20
10	58 18.9	106.0	58 49.0	104.3	59 17.9	102.7	59 45.5	100.9	60 11.5	99.1	10
2 00	60 19.1	108.4	60 50.3	106.7	61 20.1	104.9	61 48.6	103.0	62 15.4	101.1	2 00
1 50	62 17.5	111.1	62 50.0	109.3	63 21.0	107.4	63 50.5	105.4	64 18.2	103.4	1 50
40	65 13.7	114.0	65 47.6	112.1	66 20.1	110.1	66 51.0	108.0	67 20.1	105.9	40
30	66 07.0	117.4	66 42.7	115.4	67 17.0	113.3	67 49.4	111.0	68 20.1	108.7	30
20	67 56.8	121.1	68 34.6	119.0	69 11.1	116.8	69 45.7	114.5	70 18.2	112.0	20
10	69 42.1	125.5	70 22.4	123.3	71 01.2	120.9	71 38.0	118.5	72 13.0	115.9	10
1 00	71 21.3	130.5	72 04.5	128.3	72 46.3	125.9	73 26.5	123.3	74 04.1	120.5	1 00
0 50	72 52.7	136.3	73 39.2	134.1	74 24.5	131.7	75 07.7	129.1	75 48.7	126.2	0 50
40	74 14.4	143.1	75 04.3	141.0	75 53.2	138.7	76 40.6	136.1	77 25.9	133.2	40
30	75 22.7	150.9	76 16.5	149.1	77 09.5	147.0	78 00.5	144.6	78 51.0	141.9	30
20	76 15.5	159.8	77 12.3	158.5	78 08.8	156.8	79 04.6	155.0	79 59.3	152.7	20
10	76 48.6	169.7	77 47.8	168.9	78 46.8	168.0	79 45.6	167.0	80 44.2	165.7	10
0 00	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	81 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

11° 15.4

12° 17.3

143° 03.6

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	2 05. 8	91. 3	1 33. 1	92. 2	1 00. 4	93. 1	0 27. 7	93. 9			5 50
40	4 11. 5	92. 7	3 38. 7	93. 6	3 05. 9	94. 4	2 33. 0	95. 2	2 00. 1	96. 1	40
30	6 17. 1	94. 1	5 44. 2	95. 0	5 11. 2	95. 8	4 38. 2	96. 6	4 05. 1	97. 4	30
20	8 22. 4	95. 5	7 49. 3	96. 3	7 16. 2	97. 2	6 42. 9	98. 0	6 09. 6	98. 8	20
10	10 27. 5	96. 9	9 54. 2	97. 7	9 20. 8	98. 6	8 47. 2	99. 4	8 13. 6	100. 2	10
5 00	12 32. 2	98. 3	11 58. 7	99. 1	11 25. 0	100. 0	10 51. 1	100. 8	10 17. 1	101. 7	5 00
4 50	14 36. 4	99. 7	14 02. 6	100. 6	13 28. 6	101. 4	12 54. 4	102. 3	12 20. 0	103. 1	4 50
40	16 40. 1	101. 2	16 05. 9	102. 1	15 31. 5	102. 9	14 56. 9	103. 8	14 22. 1	104. 6	40
30	18 43. 2	102. 7	18 08. 4	103. 6	17 33. 8	104. 4	16 58. 7	105. 3	16 23. 4	106. 1	30
20	20 45. 5	104. 2	20 10. 5	105. 1	19 35. 2	106. 0	18 59. 6	106. 9	18 23. 8	107. 7	20
10	22 47. 0	105. 8	22 11. 5	106. 7	21 35. 6	107. 6	20 59. 4	108. 5	20 23. 1	109. 3	10
4 00	24 47. 6	107. 5	24 11. 5	108. 3	23 35. 0	109. 2	22 58. 3	110. 1	22 21. 2	110. 9	4 00
3 50	26 47. 0	109. 2	26 10. 2	110. 0	25 33. 2	110. 9	24 55. 8	111. 8	24 18. 0	112. 6	3 50
40	28 45. 2	110. 9	28 07. 8	111. 7	27 30. 0	112. 6	26 51. 9	113. 5	26 13. 5	114. 4	40
30	30 42. 0	112. 7	30 03. 9	113. 5	29 25. 3	114. 4	28 46. 4	115. 3	28 07. 2	116. 2	30
20	32 37. 3	114. 6	31 58. 3	115. 4	31 18. 9	116. 3	30 39. 2	117. 2	29 59. 1	118. 1	20
10	34 30. 8	116. 6	33 51. 0	117. 4	33 10. 8	118. 3	32 30. 2	119. 2	31 49. 2	120. 1	10
3 00	36 22. 3	118. 6	35 41. 0	119. 5	35 00. 4	120. 4	34 18. 8	121. 2	33 36. 8	122. 1	3 00
2 50	38 11. 6	120. 8	37 29. 9	121. 6	36 47. 8	122. 5	36 05. 1	123. 4	35 22. 2	124. 3	2 50
40	39 58. 5	123. 0	39 15. 7	123. 9	38 32. 4	124. 8	37 48. 7	125. 7	37 04. 7	126. 5	40
30	41 42. 6	125. 4	40 58. 7	126. 3	40 14. 2	127. 2	39 29. 5	128. 1	38 44. 2	128. 9	30
20	43 23. 6	127. 9	42 38. 4	128. 8	41 52. 8	129. 7	41 06. 7	130. 5	40 20. 4	131. 4	20
10	45 01. 0	130. 5	44 14. 7	131. 4	43 27. 8	132. 3	42 40. 6	133. 1	41 53. 0	134. 0	10
2 00	46 34. 6	133. 3	45 47. 0	134. 2	44 58. 9	135. 0	44 10. 3	135. 9	43 21. 5	136. 7	2 00
1 50	48 03. 9	136. 3	47 14. 9	137. 2	46 25. 4	138. 0	45 35. 6	138. 8	44 45. 5	139. 6	1 50
40	49 28. 3	139. 4	48 37. 9	140. 2	47 47. 1	141. 0	46 55. 9	141. 8	46 04. 5	142. 6	40
30	50 47. 3	142. 8	49 55. 5	143. 5	49 03. 4	144. 3	48 10. 9	145. 0	47 18. 2	145. 8	30
20	52 00. 4	146. 3	51 07. 2	147. 0	50 13. 7	147. 7	49 19. 9	148. 4	48 26. 0	149. 1	20
10	53 06. 8	149. 9	52 12. 4	150. 6	51 17. 6	151. 3	50 22. 6	152. 0	49 27. 4	152. 6	10
1 00	54 06. 3	153. 8	53 10. 5	154. 4	52 14. 4	155. 0	51 18. 3	155. 6	50 22. 0	156. 1	1 00
0 50	54 57. 8	157. 8	54 00. 9	158. 4	53 03. 7	158. 9	52 06. 3	159. 4	51 09. 0	159. 9	0 50
40	55 41. 0	162. 1	54 43. 0	162. 5	53 44. 8	162. 9	52 46. 7	163. 3	51 48. 4	163. 7	40
30	56 15. 2	166. 4	55 16. 2	166. 8	54 17. 4	167. 1	53 18. 4	167. 4	52 19. 4	167. 7	30
20	56 39. 9	170. 9	55 40. 5	171. 1	54 41. 0	171. 3	53 41. 5	171. 6	52 41. 9	171. 8	20
10	56 55. 0	175. 4	55 55. 1	175. 5	54 55. 2	175. 6	53 55. 4	175. 8	52 55. 5	175. 9	10
0 00	57 0. 0	180. 0	56 0. 0	180. 0	55 0. 0	180. 0	54 0. 0	180. 0	53 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 27.2	96.9	0 54.2	97.8	0 21.2	98.6					5 40
30	3 31.8	98.3	2 58.6	99.1	2 25.4	99.9	1 52.0	100.8	1 18.7	101.6	30
20	5 36.1	99.7	5 02.6	100.5	4 29.0	101.3	3 55.4	102.2	3 21.7	103.0	20
10	7 39.9	101.1	7 06.0	101.9	6 32.1	102.7	5 58.1	103.6	5 23.9	104.4.	10
5 00	9 43.0	102.5	9 08.7	103.4	8 34.4	104.2	7 59.9	105.0	7 25.4	105.8	5 00
4 50	11 45.6	103.9	11 10.8	104.8	10 35.9	105.6	10 01.1	106.4	9 25.9	107.3	4 50
40	13 47.1	105.4	13 11.9	106.3	12 36.7	107.1	12 01.2	107.9	11 25.6	108.8	40
30	15 48.0	106.9	15 12.2	107.8	14 36.4	108.6	14 00.3	109.4	13 24.1	110.3	30
20	17 47.8	108.5	17 11.5	109.4	16 35.0	110.2	15 58.4	111.0	15 21.6	111.8	20
10	19 46.5	110.1	19 09.5	111.0	18 32.5	111.8	17 55.1	112.6	17 17.6	113.4	10
4 00	21 43.9	111.7	21 06.3	112.6	20 28.5	113.4	19 50.5	114.2	19 12.4	115.1	4 00
3 50	23 40.1	113.4	23 01.8	114.3	22 23.3	115.1	21 44.5	115.9	21 05.5	116.8	3 50
40	25 34.7	115.2	24 55.6	116.1	24 16.3	116.9	23 36.7	117.7	22 57.0	118.5	40
30	27 27.8	117.0	26 47.8	117.9	26 07.7	118.7	25 27.2	119.5	24 46.5	120.3	30
20	29 18.7	118.9	28 38.0	119.8	27 56.9	120.6	27 15.6	121.4	26 34.1	122.2	20
10	31 07.8	120.9	30 26.1	121.8	29 44.2	122.6	29 01.8	123.4	28 19.3	124.2	10
3 00	32 54.6	123.0	32 11.9	123.8	31 28.9	124.6	30 45.6	125.4	30 02.0	126.2	3 00
2 50	34 38.8	125.1	33 55.1	125.9	33 11.1	126.8	32 26.8	127.6	31 42.2	128.3	2 50
40	36 20.3	127.3	35 35.5	128.2	34 50.3	129.0	34 04.9	129.8	33 19.3	130.5	40
30	37 58.7	129.7	37 12.8	130.5	36 26.6	131.3	35 40.1	132.1	34 53.3	132.9	30
20	39 33.7	132.2	38 46.6	133.0	37 59.2	133.7	37 11.5	134.5	36 23.6	135.3	20
10	41 05.1	134.8	40 16.8	135.5	39 28.3	136.2	38 39.3	137.0	37 50.2	137.8	10
2 00	42 32.3	137.5	41 42.8	138.2	40 53.0	139.0	40 02.8	139.7	39 12.6	140.4	2 00
1 50	43 55.0	140.3	43 04.2	141.0	42 13.2	141.8	41 21.9	142.5	40 30.5	143.2	1 50
40	45 12.8	143.3	44 20.8	144.0	43 28.5	144.7	42 36.0	145.3	41 43.4	146.0	40
30	46 25.2	146.4	45 32.0	147.1	44 38.8	147.7	43 44.8	148.3	42 51.1	149.0	30
20	47 31.8	149.7	46 37.3	150.3	45 42.7	150.9	44 47.9	151.5	43 52.9	152.1	20
10	48 32.1	153.1	47 36.4	153.7	46 40.7	154.2	45 44.8	154.8	44 48.8	155.3	10
1 00	49 25.4	156.6	48 28.8	157.2	47 32.0	157.6	46 35.1	158.1	45 38.2	158.6	1 00
0 50	50 11.6	160.3	49 14.4	160.8	48 16.3	161.2	47 18.4	161.6	46 20.7	162.0	0 50
40	50 50.0	164.1	49 51.6	164.5	48 53.1	164.8	47 54.5	165.1	46 55.9	165.5	40
30	51 20.4	168.0	50 21.2	168.3	49 22.1	168.5	48 23.0	168.8	47 23.8	169.1	30
20	51 42.4	172.0	50 42.7	172.1	49 43.1	172.3	48 43.5	172.5	47 43.9	172.6	20
10	51 55.6	176.0	50 55.6	176.1	49 55.7	176.1	48 55.9	176.2	47 56.0	176.3	10
0 00	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 45.5	102.5	0 12.2	103.3							5 30
20	2 48.0	103.8	2 14.2	104.7	1 40.4	105.5	1 06.6	106.3	0 32.8	107.1	20
10	4 49.9	105.2	4 15.6	106.1	3 41.3	106.9	3 07.0	107.7	2 32.7	108.5	10
5 00	6 50.7	106.7	6 16.0	107.5	5 41.1	108.3	5 06.3	109.1	4 31.3	109.9	5 00
4 50	8 50.8	108.1	8 15.5	108.9	7 40.2	109.7	7 04.7	110.5	6 29.1	111.3	4 50
40	10 49.8	109.6	10 14.0	110.4	9 38.0	111.2	9 01.9	112.0	8 25.7	112.8	40
30	12 47.9	111.1	12 11.4	111.9	11 34.7	112.7	10 57.9	113.5	10 20.9	114.3	30
20	14 44.6	112.7	14 07.4	113.5	13 30.1	114.3	12 52.6	115.1	12 14.9	115.9	20
10	16 40.0	114.3	16 02.1	115.1	15 23.9	115.9	14 45.8	116.7	14 07.3	117.5	10
4 00	18 33.8	115.9	17 55.3	116.7	17 16.4	117.5	16 37.4	118.3	15 58.2	119.1	4 00
3 50	20 26.3	117.6	19 46.8	118.4	19 07.1	119.2	18 27.2	120.0	17 47.2	120.8	3 50
40	22 16.9	119.3	21 36.6	120.1	20 56.6	120.9	20 15.3	121.7	19 34.3	122.5	40
30	24 05.6	121.1	23 24.4	121.9	22 42.9	122.7	22 01.3	123.5	21 19.3	124.3	30
20	25 52.2	123.0	25 10.1	123.8	24 27.7	124.6	23 45.1	125.4	23 02.2	126.1	20
10	27 36.5	125.0	26 53.3	125.8	26 10.0	126.6	25 26.4	127.4	24 42.6	128.1	10
3 00	29 18.2	127.0	28 34.1	127.8	27 49.7	128.6	27 05.1	129.3	26 20.2	130.1	3 00
2 50	30 57.4	129.1	30 12.2	129.9	29 26.7	130.7	28 41.1	131.4	27 55.1	132.1	2 50
40	32 33.3	131.3	31 47.1	132.1	31 00.6	132.8	30 13.9	133.5	29 26.8	134.3	40
30	34 06.2	133.6	33 18.8	134.4	32 31.2	135.1	31 43.2	135.8	30 55.1	136.5	30
20	35 35.3	136.0	34 46.9	136.7	33 58.1	137.4	33 09.2	138.1	32 19.9	138.8	20
10	37 00.8	138.5	36 11.2	139.2	35 21.3	139.9	34 31.2	140.6	33 40.8	141.2	10
2 00	38 22.0	141.1	37 31.2	141.8	36 40.2	142.4	35 49.0	143.1	34 57.5	143.7	2 00
1 50	39 38.8	143.8	38 46.7	144.5	37 54.5	145.1	37 02.1	145.7	36 09.7	146.3	1 50
40	40 50.4	146.6	39 57.4	147.2	39 04.1	147.8	38 10.7	148.4	37 17.0	149.0	40
30	41 57.0	149.6	41 02.8	150.1	40 08.4	150.7	39 13.9	151.2	38 19.2	151.8	30
20	42 57.9	152.6	42 02.6	153.1	41 07.2	153.6	40 11.7	154.1	39 16.0	154.6	20
10	43 52.7	155.8	42 56.5	156.3	42 00.0	156.7	41 03.5	157.1	40 07.0	157.6	10
1 00	44 41.1	159.0	43 43.9	159.4	42 46.7	159.8	41 49.3	160.2	40 51.9	160.6	1 00
0 50	45 22.8	162.4	44 24.7	162.7	43 26.7	163.1	42 28.7	163.4	41 30.4	163.7	0 50
40	45 57.3	165.8	44 58.7	166.1	43 59.9	166.4	43 01.2	166.6	42 02.3	166.9	40
30	46 24.6	169.3	45 25.2	169.5	44 26.0	169.7	43 26.5	169.9	42 27.4	170.1	30
20	46 44.2	172.8	45 44.6	173.0	44 44.9	173.1	43 45.2	173.2	42 45.5	173.4	20
10	46 56.1	176.4	45 56.1	176.5	44 56.2	176 5	43 56.2	176.6	42 56.3	176.7	10
0 00	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 58.2	109.3	1 24.0	110.2	0 49.4	111.0	0 14.9	111.8			5 10
5 00	3 56.4	110.7	3 21.3	111.6	2 46.2	112.4	2 11.1	113.2	1 36.0	114.0	5 00
4 50	5 53.5	112.1	5 17.8	113.0	4 41.9	113.8	4 06.1	114.6	3 30.3	115.4	4 50
40	7 49.4	113.6	7 13.0	114.4	6 36.5	115.2	6 00.0	116.0	5 23.3	116.8	40
30	9 43.7	115.1	9 06.8	115.9	8 29.5	116.7	7 52.0	117.5	7 14.8	118.3	30
20	11 37.1	116.7	10 59.2	117.4	10 21.2	118.2	9 43.0	119.0	9 04.8	119.8	20
10	13 28.8	118.3	12 50.0	119.0	12 11.1	119.8	11 32.2	120.6	10 53.1	121.4	10
4 00	15 18.8	119.9	14 39.2	120.6	13 59.5	121.4	13 19.6	122.2	12 39.6	123.0	4 00
3 50	17 06.9	121.6	16 26.5	122.3	15 45.8	123.1	15 05.1	123.8	14 24.2	124.6	3 50
40	18 53.2	123.3	18 11.9	124.0	17 30.3	124.8	16 48.6	125.5	16 06.7	126.3	40
30	20 37.3	125.1	19 55.0	125.8	19 12.5	126.6	18 29.8	127.3	17 47.0	128.0	30
20	22 19.1	126.9	20 35.8	127.6	20 52.4	128.4	19 08.7	129.1	18 24.8	129.8	20
10	23 58.5	128.8	23 14.2	129.5	22 29.7	130.3	21 45.0	131.0	21 00.2	131.7	10
3 00	25 35.1	130.8	24 49.8	131.5	24 04.3	132.2	23 18.6	132.9	22 32.7	133.6	3 00
2 50	27 08.9	132.8	26 22.5	133.5	25 35.9	134.2	24 49.1	134.9	24 02.2	135.6	2 50
40	28 39.6	135.0	27 52.1	135.7	27 04.5	136.3	26 16.7	137.0	25 28.7	137.7	40
30	30 06.9	137.2	29 18.4	137.9	28 29.5	138.5	27 40.6	139.2	26 51.5	139.8	30
20	31 30.5	139.5	30 40.9	140.1	29 51.1	140.8	29 01.0	141.4	28 10.8	142.0	20
10	32 50.3	141.9	31 59.5	142.5	31 08.6	143.1	30 17.5	143.7	29 26.2	144.3	10
2 00	34 05.8	144.3	33 14.0	144.9	32 22.0	145.5	31 29.8	146.1	30 37.5	146.7	2 00
1 50	35 16.9	146 9	34 24.1	147.5	33 30.9	148.0	32 37.8	148.6	31 44.3	149.1	1 50
40	36 23.2	149.5	35 29.2	150.1	34 35.1	150.6	33 40.9	151.1	32 46.5	151.6	40
30	37 24.4	152.3	36 29.5	152.8	35 34.3	153.3	34 39.1	153.7	33 43.9	154.2	30
20	38 20.2	155.1	37 24.3	155.6	36 28.3	156.0	35 32.2	156.4	34 36.0	156.9	20
10	39 10.1	158.0	38 13.5	158.5	37 16.6	158.8	36 19.7	159.2	35 22.7	159.6	10
1 00	39 54.4	161.0	38 56.8	161.4	37 59.1	161.7	37 01.4	162.1	36 03.6.	162.4	1 00
0 50	40 32.2	164.0	39 33.9	164.4	38 35.6	164.7	37 37.1	165.0	36 38.7	165.2	0 50
40	41 03.5	167.1	40 04.6	167.4	39 05.7	167.6	38 06.8	167.9	37 07.8	168.1	40
30	41 28.1	170.3	40 28.7	170.5	39 29.3	170.7	38 29.9	170.9	37 30.5	171.1	30
20	41 45.8	173.5	40 46.1	173.7	39 46.4	173.8	38 46.6	173.9	37 46.9	174.0	20
10	41 56.4	176.8	40 56.5	176.8	39 56.6	176.9	38 56.7	176.9	37 56.7	177.0	10
0 00	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 00.9	114.8	0 25.7	115.6							5 00
4 50	2 54.3	116.2	2 18.4	117.0	1 42.4	117.8	1 06.6	118.6	0 30.4	119.4	4 50
40	4 46.6	117.6	4 09.8	118.4	3 33.0	119.2	2 56.2	120.0	2 19.3	120.8	40
30	6 37.3	119.1	5 59.7	119.9	5 22.1	120.6	4 44.3	121.4	4 06.6	122.2	30
20	8 26.4	120.6	7 48.0	121.4	7 09.5	122.1	6 30.9	122.9	5 52.2	123.7	20
10	10 13.8	122.1	9 34.5	122.9	8 55.2	123.6	8 15.6	124.4	7 35.9	125.2	10
4 00	11 59.4	123.7	11 19.2	124.5	10 38.9	125.2	9 58.5	126.0	9 17.9	126.7	4 00
3 50	13 43.1	125.3	13 01.9	126.1	12 20.6	126.8	11 39.2	127.6	10 57.7	128.3	3 50
40	15 24.7	127.0	14 42.5	127.8	14 00.2	128.5	13 17.8	129.2	12 35.3	129.9	40
30	17 04.1	128.7	16 20.9	129.5	15 37.6	130.2	14 54.1	130.9	14 10.6	131.6	30
20	18 40.8	130.5	17 56.6	131.3	17 12.3	132.0	16 27.9	132.7	15 43.3	133.4	20
10	20 15.3	132.4	19 29.9	133.1	18 44.6	133.8	17 59.1	134.5	17 13.4	135.2	10
3 00	21 46.6	134.3	21 00.4	135.0	20 13.9	135.7	19 27.3	136.4	18 40.6	137.0	3 00
2 50	23 15.2	136.2	22 27.7	136.9	21 40.2	137.6	20 52.6	138.3	20 04.8	138.9	2 50
40	24 40.4	138.3	23 52.0	139.0	23 03.4	139.6	22 14.7	140.3	21 25.9	140.9	40
30	26 02.2	140.4	25 12.7	141.1	24 23.2	141.7	23 33.4	142.3	22 43.5	142.9	30
20	27 20.4	142.6	26 29.9	143.2	25 39.3	143.8	24 48.5	144.4	23 57.6	145.0	20
10	28 34.8	144.9	27 43.2	145.5	26 51.6	146.0	25 59.7	146.6	25 07.7	147.2	10
2 00	29 45.1	147.2	28 52.5	147.8	27 59.7	148.3	27 06.9	148.9	26 13.9	149.4	2 00
1 50	30 50.9	149.6	29 57.3	150.2	29 03.6	150.7	28 09.8	151.2	27 15.7	151.7	1 50
40	32 52.1	152.1	30 57.5	152.6	30 02.8	153.1	29 08.1	153.6	28 13.2	154.0	40
30	32 48.5	154.7	31 52.9	155.1	30 57.3	155.6	30 01.7	156.0	29 05.9	156.4	30
20	33 39.7	157.3	32 43.3	157.7	31 46.9	158.1	30 50.3	158.5	29 53.8	158.9	20
10	34 25.7	160.0	33 28.3	160.3	32 31.2	160.7	31 33.8	161.1	30 36.6	161.4	10
1 00	35 05.8	162.7	34 08.0	163.0	33 10.0	163.4	32 12.1	163.7	31 14.1	164.0	1 00
0 50	35 40.3	165.5	34 41.7	165.8	33 43.3	166.1	32 44.7	166.3	31 46.0	166.6	0 50
40	36 08.8	168.3	35 09.7	168.6	34 10.7	168.8	33 11.6	169.0	32 12.4	169.2	40
30	36 31.1	171.2	35 31.6	171.4	34 32.2	171.6	33 32.7	171.7	32 33.2	171.9	30
20	36 47.1	174.1	35 47.3	174.2	34 47.6	174.4	33 47.8	174.5	32 48.0	174.6	20
10	36 56.8	177.1	35 56.8	177.1	34 56.9	177.2	33 57.0	177.2	32 57.1	177.3	10
0 00	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 10.1	85.3	6 10
6 00	0 00.0	90.0	0 33.5	89.2	1 07.1	88.4	1 40.6	87.5	2 14.1	86.7	6 00
5 50	2 04.3	91.4	2 37.9	90.6	3 11.4	89.8	3 44.9	88.9	4 18.3	88.1	5 50
40	4 08.6	92.8	4 42.2	92.0	5 15.8	91.2	5 49.3	90.3	6 22.7	89.5	40
30	6 12.8	94.2	6 46.4	93.4	7 20.0	92.6	7 53.6	91.7	8 27.0	90.9	30
20	8 16.6	95.6	8 50.5	94.8	9 24.2	94.0	9 57.8	93.1	10 31.3	92.3	20
10	10 20.3	97.0	10 54.5	96.2	11 28.2	95.4	12 02.0	94.5	12 35.6	93.7	10
5 00	12 23.4	98.5	12 57.7	97.7	13 31.8	96.8	14 05.8	96.0	14 39.6	95.1	5 00
4 50	14 26.1	100.0	15 00.7	99.2	15 35.1	98.3	16 09.2	97.5	16 43.2	96.6	4 50
40	16 28.3	101.5	17 03.2	100.7	17 37.9	99.8	18 12.4	98.9	18 46.6	98.1	40
30	18 29.9	103.0	19 05.1	102.2	19 40.1	101.3	20 14.9	100.4	20 49.4	99.6	30
20	20 30.6	104.6	21 06.3	103.8	21 41.7	102.9	22 16.9	102.0	22 51.7	101.1	20
10	22 30.5	106.2	23 06.7	105.4	23 42.5	104.5	24 18.1	103.6	24 53.3	102.7	10
4 00	24 29.4	107.9	25 06.1	107.0	25 42.5	106.1	26 18.7	105.3	26 54.4	104.4	4 00
3 50	26 27.1	109.6	27 04.4	108.7	27 41.4	107.8	28 18.1	107.0	28 54.3	106.1	3 50
40	28 23.6	111.4	29 01.6	110.5	29 39.2	109.6	30 16.5	108.7	30 53.3	107.8	40
30	30 18.6	113.2	30 57.3	112.3	31 35.7	111.4	32 13.6	110.5	32 51.1	109.6	30
20	32 12.1	115.1	32 51.6	114.3	33 30.6	113.3	34 09.3	112.4	34 47.5	111.5	20
10	34 03.7	117.1	34 44.1	116.3	35 23.9	115.3	36 03.5	114.4	36 42.5	113.5	10
3 00	35 53.4	119.2	36 34.6	118.3	37 15.4	117.4	37 55.7	116.5	38 35.6	115.5	3 00
2 50	37 40.7	121.4	38 22.9	120.5	39 04.7	119.6	39 46.0	118.7	40 26.8	117.7	2 50
40	39 25.5	123.7	40 08.8	122.8	40 51.6	121.8	41 34.0	120.9	42 15.9	119.9	40
30	41 07.5	126.1	41 52.0	125.2	42 35.8	124.3	43 19.2	123.3	44 02.2	122.3	30
20	42 46.4	128.6	43 31.9	127.7	44 17.0	126.8	45 01.7	125.9	45 45.8	124.9	20
10	44 21.7	131.3	45 08.6	130.4	45 54.8	129.5	46 40.6	128.6	47 26.0	127.6	10
2 00	45 53.2	134.1	46 41.2	133.2	47 28.8	132.3	48 16.0	131.4	49 02.7	130.5	2 00
1 50	47 20.2	137.1	48 09.5	136.2	48 58.5	135.3	49 47.1	134.4	50 35.2	133.5	1 50
40	48 42.5	140.2	49 33.2	139.4	50 23.5	138.5	51 13.5	137.6	52 03.0	136.7	40
30	49 59.3	143.5	50 51.5	142.7	51 43.0	141.9	52 34.5	141.1	53 25.5	140.2	30
20	51 10.4	146.9	52 03.8	146.2	52 59.6	145.4	53 49.7	144.6	54 42.1	143.8	20
10	52 14.8	150.6	53 09.6	149.9	54 04.0	149.2	54 58.1	148.5	55 52.0	147.7	10
1 00	53 12.3	154.4	54 08.2	153.8	55 04.0	153.2	55 59.5	152.5	56 54.8	151.8	1 00
0 50	54 02.2	158.4	54 59.3	157.9	55 56.1	157.3	56 52.9	156.7	57 49.5	156.1	0 50
40	54 43.8	162.5	55 41.9	162.1	56 39.8	161.6	57 37.7	161.1	58 35.4	160.6	40
30	55 16.8	166.8	56 15.8	166.4	57 14.5	166.1	58 13.2	165.7	59 12.0	165.3	30
20	55 40.7	171.1	56 40.3	170.9	57 39.8	170.6	58 39.2	170.4	59 38.6	170.1	20
10	55 55.2	175.5	56 55.0	175.4	57 54.9	175.3	58 54.7	175.2	59 54.6	175.0	10
0 00	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 21.6	80.6	0 55.4	79.8	6 20
10	0 43.8	84.5	1 17.4	83.6	1 50.9	82.8	2 24.6	82.0	2 58.0	81.2	10
6 00	2 47.6	85.9	3 21.0	85.0	3 54.5	84.2	4 27.8	83.4	5 01.1	82.5	6 00
5 50	4 51.8	87.2	4 25.1	86.4	5 58.4	85.6	6 31.6	84.7	7 04.6	83.9	5 50
40	6 56.0	88.6	7 29.2	87.8	8 02.4	86.9	8 35.4	86.1	9 08.4	85.3	40
30	9 00.2	90.0	9 33.5	89.2	10 06.7	88.3	10 39.6	87.5	11 12.4	86.6	30
20	11 04.7	91.4	11 04.7	90.6	12 37.9	89.7	12 11.0	88.9	13 43.9	88.0	20
10	13 09.1	93.8	13 42.4	92.0	14 15.3	91.1	14 48.4	90.3	15 21.0	89.4	10
5 00	15 13.1	94.3	15 46.5	93.4	16 19.6	92.6	16 52.5	91.7	17 25.2	90.8	5 00
4 50	17 16.9	95.7	17 50.5	94.8	18 23.8	94.0	18 56.9	93.1	19 29.6	92.2	4 50
40	19 20.6	97.2	19 54.3	96.3	20 27.8	95.4	21 00.9	94.6	21 33.8	93.7	40
30	21 23.7	98.7	21 57.7	97.8	22 31.3	96.9	23 04.8	96.0	23 37.8	95.1	30
20	23 26.3	100.2	24 00.6	99.4	24 34.6	98.5	25 08.2	97.5	25 41.5	96.6	20
10	25 28.3	101.8	26 03.0	100.9	26 37.2	100.0	27 11.2	99.1	27 44.8	98.1	10
4 00	27 29.8	103.5	28 04.8	102.5	28 39.5	101.6	29 13.7	100.7	29 47.6	99.7	4 00
3 50	29 30.3	105.1	30 05.8	104.2	30 40.8	103.3	31 15.7	102.3	31 49.9	101.3	3 50
40	31 29.8	106.8	32 05.8	105.9	32 41.4	105.0	33 16.6	104.0	33 51.4	103.0	40
30	33 28.2	108.6	34 04.9	107.7	34 41.1	106.8	35 16.9	105.8	35 52.2	104.8	30
20	35 25.3	110.5	36 02.7	109.6	36 39.6	108.6	37 16.0	107.6	37 51.9	106.6	20
10	37 21.1	112.5	37 59.1	111.6	38 36.8	110.5	39 14.0	109.5	39 50.5	108.5	10
3 00	39 15.0	114.5	39 54.0	113.6	40 32.4	112.6	41 10.3	111.5	41 47.7	110.5	3 00
2 50	41 07.2	116.7	41 46.8	115.7	42 26.4	114.7	43 05.3	113.6	43 43.3	112.6	2 50
40	42 57.2	119.0	43 38.0	118.0	44 18.3	116.9	44 58.0	115.9	45 37.2	114.8	40
30	44 44.8	121.4	45 26.6	120.4	46 08.0	119.3	46 49.0	118.3	47 29.0	117.2	30
20	46 29.4	123.9	47 12.5	122.9	47 55.1	121.9	48 37.0	120.8	49 18.3	119.7	20
10	48 11.0	126.6	48 55.3	125.6	49 39.2	124.6	50 22.4	123.5	51 05.0	122.4	10
2 00	49 48.9	129.5	50 34.6	128.5	51 19.8	127.4	52 04.4	126.3	52 48.4	125.2	2 00
1 50	51 22.8	132.5	52 09.9	131.5	52 56.5	130.5	53 42.7	129.4	54 28.0	128.3	1 50
40	52 52.0	135.8	53 40.7	134.8	54 28.8	133.8	55 16.3	132.7	56 03.3	131.6	40
30	54 16.0	139.3	55 06.1	138.3	55 55.9	137.3	56 45.1	136.3	57 33.6	135.2	30
20	55 34.2	142.9	56 25.9	142.0	57 17.2	141.1	58 08.0	140.1	58 58.3	139.1	20
10	56 45.7	146.9	57 38.9	146.0	58 31.1	145.1	59 24.4	144.2	60 16.4	143.2	10
1 00	57 49.8	151.0	58 44.6	150.3	59 39.1	149.5	60 33.2	148.6	61 26.9	147.7	1 00
0 50	58 45.9	155.4	59 42.0	154.7	60 38.0	154.0	61 33.7	153.2	62 29.0	152.4	0 50
40	59 33.0	160.0	60 30.4	159.5	61 27.7	158.9	62 24.8	158.2	63 21.7	157.5	40
30	60 10.6	164.9	61 09.0	164.4	62 07.4	163.9	63 05.9	163.4	64 04.0	162.9	30
20	60 37.9	169.8	61 37.2	169.5	62 36.5	169.2	63 35.6	168.8	64 34.8	168.4	20
10	60 54.5	174.8	61 54.3	174.7	62 54.1	174.6	63 53.9	174.4	64 53.7	174.2	10
0 00	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30			0 01.6	76.7	0 35.8	75.9	1 10.1	75.1	1 44.2	74.3	6 30
20	1 29.2	78.9	2 03.0	78.1	2 36.7	77.3	3 10.5	76.4	3 44.2	75.6	20
10	3 31.6	80.3	4 05.0	79.5	4 38.4	78.6	5 11.8	77.8	5 45.1	77.0	10
6 00	5 34.4	81.7	6 07.5	80.9	6 40.6	80.0	7 13.6	79.2	7 46.5	78.3	6 00
5 50	7 37.6	83.0	8 10.5	82.2	8 43.4	81.3	9 16.1	80.5	9 48.6	79.7	5 50
40	9 41.2	94.4	10 13.9	83.6	10 46.5	82.7	11 18.9	81.9	11 51.2	81.0	40
30	11 45.1	85.8	12 17.6	84.9	12 50.0	84.0	13 22.1	83.2	13 54.1	82.3	30
20	13 49.2	87.2	14 21.6	86.3	14 53.8	85.4	15 25.8	84.5	15 57.6	83.6	20
10	15 53.4	88.5	16 25.8	87.6	16 57.9	86.7	17 29.8	85.9	18 01.4	85.0	10
5 00	17 57.7	89.9	18 30.0	89.0	19 02.0	88.1	19 33.8	87.2	20 05.3	86.3	5 00
4 50	20 02.2	91.3	20 34.4	90.4	21 06.5	89.5	21 38.1	88.6	22 09.7	87.7	4 50
40	22 06.5	92.8	22 38.8	91.8	23 10.8	90.9	23 42.5	90.0	24 13.8	89.1	40
30	24 10.5	94.2	24 42.9	93.2	25 15.2	92.3	25 46.8	91.4	26 18.1	90.5	30
20	26 14.4	95.7	26 47.0	94.7	27 19.2	93.8	27 51.0	92.8	28 22.5	91.9	20
10	28 18.1	97.2	28 50.8	96.2	29 23.2	95.3	29 55.1	94.3	30 26.8	93.3	10
4 00	30 21.1	98.8	30 54.2	97.8	31 26.8	96.8	31 59.0	95.8	32 30.7	94.8	4 00
3 50	32 23.8	100.4	32 57.2	99.4	33 30.1	98.4	34 02.5	97.4	34 34.6	96.3	3 50
40	34 25.7	102.0	34 59.6	101.0	35 32.9	100.0	36 05.7	99.0	36 38.0	97.9	40
30	36 27.0	103.8	37 01.2	102.7	37 35.0	101.7	38 08.2	100.6	38 40.8	99.6	30
20	38 27.3	105.6	39 02.2	104.5	39 36.4	103.5	40 10.1	102.4	40 43.2	101.3	20
10	40 26.5	107.5	41 02.0	106.4	41 36.9	105.3	42 11.1	104.2	42 44.8	103.1	10
3 00	42 24.5	109.4	43 00.7	108.3	43 36.3	107.2	44 11.2	106.1	44 45.4	104.9	3 00
2 50	44 21.0	111.5	44 58.0	110.4	45 34 4	109.3	46 10.0	108.1	46 44.9	106.9	2 50
40	46 15.8	113.7	46 53.7	112.6	47 30.9	111.4	48 07.4	110.2	48 43.2	109.0	40
30	48 08.6	116.1	48 47.6	114.9	49 25.9	113.7	50 03.5	112.5	50 40.0	111.3	30
20	49 59.1	118.5	50 39.2	117.4	51 18.5	116.2	51 57.0	114.9	52 34.9	113.7	20
10	51 47.0	121.2	52 28.3	120.0	53 08.9	118.8	53 48.6	117.5	54 27.7	116.3	10
2 00	53 31.8	124.1	54 14.5	122.9	54 56.4	121.6	55 37.5	120.3	56 17.9	119.0	2 00
1 50	55 12.8	127.2	55 57.1	126.0	56 40.5	124.7	57 23.0	123.4	58 05.0	122.1	1 50
40	56 49.7	130.5	57 35.6	129.3	58 20.6	128.0	59 04.9	126.7	59 48.4	125.4	40
30	58 21.9	134.1	59 09.3	132.9	59 56.1	131.7	60 42.2	130.3	61 27.8	129.0	30
20	59 48.2	138.0	60 37.5	136.8	61 26.1	135.6	62 14.0	134.3	63 01.4	133.0	20
10	61 08.1	142.2	61 59.2	141.1	62 49.9	139.9	63 39.8	138.7	64 29.1	137.4	10
1 00	62 20.4	146.7	63 13.4	145.7	64 05.9	144.6	64 57.9	143.4	65 49.4	142.2	1 00
0 50	63 24.2	151.6	64 19.0	150.7	65 13.5	149.7	66 07.5	148.6	67 01.2	147.5	0 50
40	64 18.5	156.8	65 15.0	156.0	66 11.2	155.1	67 07.1	154.2	68 02.7	153.2	40
30	65 02.0	162.3	66 00.0	161.7	66 57.7	161.0	67 55.2	160.2	68 52.8	159.4	30
20	65 34.0	168.0	66 33.1	167.6	67 32.0	167.1	68 30.9	166.6	69 29.7	166.0	20
10	65 53.4	174.0	66 53.2	173.8	67 52.9	173.5	68 52.6	173.2	69 52.3	172.9	10
0 00	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 07.4	68.2	0 42.6	67.4	6 50
40	0 19.5	72.0	0 54.1	71.2	1 28.7	70.4	2 03.4	69.6	2 38.0	68.8	40
30	2 18.2	73.4	2 52.4	72.6	3 26.4	71.8	4 00.4	71.0	4 34.5	70.1	30
20	4 17.8	74.8	4 51.4	74.0	5 25.0	73.1	5 58.5	72.3	6 31.9	71.5	20
10	6 18.3	76.1	6 51.4	75.3	7 24.4	74.5	7 57.4	73.6	8 30.2	72.8	10
6 00	8 19.3	77.5	8 52.0	76.6	9 24.6	75.8	9 57.1	74.9	10 29.4	74.1	6 00
5 50	10 21.1	78.8	10 53.3	78.0	11 25.7	77.1	11 57.4	76.2	12 29.3	75.4	5 50
40	12 23.3	80.1	12 55.2	79.3	13 27.0	78.4	13 58.6	77.5	14 30.0	76.6	40
30	14 26.2	81.4	14 57.7	80.6	15 29.1	79.7	16 00.5	78.8	16 31.2	77.9	30
20	16 29.3	82.7	17 00.6	81.9	17 31.7	81.0	18 02.6	80.1	18 33.3	79.2	20
10	18 32.8	84.1	19 03.9	83.2	19 34.7	82.3	20 05.2	81.4	20 35.6	80.4	10
5 00	20 36.6	85.4	21 07.5	84.5	21 38.1	83.6	22 08.4	82.7	22 38.5	81.7	5 00
4 50	22 40.6	86.7	23 11.4	85.8	23 41.6	84.9	24 11.8	83.9	24 41.7	83.0	4 50
40	24 44.9	88.1	25 15.5	87.1	25 45.8	86.2	26 15.7	85.2	26 45.3	84.3	40
30	26 49.1	89.5	27 19.8	88.5	27 49.9	87.6	28 19.5	86.6	28 49.1	85.6	30
20	28 53.5	90.9	29 24.1	89.9	29 54.2	88.9	30 23.9	87.9	30 53.2	86.9	20
10	30 57.7	92.3	31 28.5	91.3	31 58.6	90.3	32 28.1	89.3	32 57.4	88.2	10
4 00	33 02.0	93.8	33 32.7	92.8	34 02.9	91.7	34 32.6	90.7	35 01.8	89.6	4 00
3 50	35 06.0	95.3	35 37.1	94.3	36 07.1	93.2	36 36.9	92.1	37 06.2	91.0	3 50
40	37 09.7	96.9	37 40.8	95.8	38 11.3	94.7	38 41.2	93.6	39 10.4	92.4	40
30	39 12.9	98.5	39 44.8	97.4	40 15.0	96.3	40 45.1	95.1	41 14.5	93.9	30
20	41 15.6	100.2	41 47.4	99.0	42 18.5	97.9	42 48.9	96.7	43 18.5	95.5	20
10	43 17.7	101.9	43 49.5	100.7	44 21.2	99.6	44 52.1	98.4	45 22.1	97.1	10
3 00	45 18.9	103.8	45 51.7	102.6	46 23.6	101.4	46 54.9	100.1	47 25.2	98.8	3 00
2 50	47 19.1	105.7	47 52.5	104.5	48 25.1	103.2	48 56.8	101.9	49 27.7	100.6	2 50
40	49 18.2	107.8	49 52.4	106.5	50 25.7	105.2	50 58.2	103.9	51 29.7	102.5	40
30	51 16.9	110.0	51 50.9	108.7	52 25.0	107.3	52 58.2	106.0	53 30.5	104.6	30
20	53 11.9	112.4	53 47.9	111.0	54 23.0	109.6	54 57.2	108.2	55 30.3	106.8	20
10	55 05.7	114.9	55 43.0	113.5	56 19.1	112.1	56 54.4	110.6	57 28.5	109.1	10
2 00	56 57.3	117.7	57 35.8	116.3	58 13.3	114.8	58 49.8	113.3	59 25.3	111.7	2 00
1 50	58 45.9	120.7	59 25.9	119.2	60 04.8	117.7	60 42.8	116.1	61 19.5	114.5	1 50
40	60 31.1	124.0	61 12.7	122.5	61 53.3	120.9	62 32.9	119.3	63 11.4	117.6	40
30	62 11.9	127.6	62 55.1	126.1	63 37.8	124.5	64 19.2	122.9	64 59.6	121.1	30
20	63 47.9	131.6	64 33.4	130.1	65 17.9	128.5	66 01.5	126.8	66 44.0	125.0	20
10	65 17.5	136.0	66 05.4	134.5	66 52.0	132.9	67 38.1	131.3	68 22.7	129.5	10
1 00	66 40.3	140.8	67 30.3	139.4	68 19.4	137.9	69 07.9	136.3	69 55.4	134.6	1 00
0 50	67 54.1	146.2	68 46.5	144.9	69 38.2	143.5	70 29.2	141.9	71 19.5	140.3	0 50
40	68 58.0	152.1	69 52.7	151.0	70 46.9	149.7	71 40.6	148.3	72 33.7	146.8	40
30	69 49.9	158.6	70 46.5	157.6	71 43.0	156.6	72 39.2	155.4	73 34.5	154.1	30
20	70 28.3	165.4	71 26.8	164.7	72 25.1	164.0	73 23.3	163.1	74 21.4	162.2	20
10	70 52.0	172.6	71 51.6	172.3	72 51.1	171.9	73 50.7	171.4	74 50.1	170.9	10
0 00	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00			0 00.2	64.4	0 36.2	63.6	1 12.1	62.8	1 48.0	62.0	7 00
6 50	1 17.8	66.6	1 53.1	65.8	2 28.2	65.0	3 03.3	64.2	3 38.5	63.3	6 50
40	3 12.5	68.0	3 47.0	67.1	4 21.5	66.3	4 56.0	65.5	5 30.3	64.7	40
30	5 08.3	69.3	5 42.2	68.5	6 16.0	67.6	6 49.7	66.8	7 23.3	66.0	30
20	7 05.2	70.6	7 38.4	69.8	8 11.5	68.9	8 44.5	68.1	9 17.4	67.3	20
10	9 02.9	71.9	9 35.6	71.1	10 08.0	70.2	10 40.4	69.4	11 12.6	68.5	10
6 00	11 01.6	73.2	11 33.6	72.4	12 05.5	71.5	12 37.3	70.6	13 08.8	69.8	6 00
5 50	13 01.0	74.5	13 32.5	73.6	14 03.8	72.7	14 35.0	71.8	15 05.9	71.0	5 50
40	15 01.2	75.7	15 32.2	74.8	16 03.0	74.0	16 33.6	73.1	17 03.9	72.2	40
30	17 02.1	77.0	17 32.6	76.1	18 12.8	75.2	18 32.8	74.3	19 02.7	73.4	30
20	19 03.6	78.3	19 33.7	77.3	20 03.5	76.4	20 33.0	75.5	21 02.2	74.6	20
10	21 05.6	79.5	21 35.2	78.5	22 04.6	77.6	22 33.6	76.7	23 02.3	75.7	10
5 00	23 08.1	80.8	23 37.4	79.8	24 06.4	78.9	24 35.0	77.9	25 03.2	76.9	5 00
4 50	25 11.0	82.0	25 40.0	81.0	26 08.6	80.1	26 36.7	79.1	27 04.7	78.1	4 50
40	27 14.4	83.3	27 43.1	82.3	28 11.4	81.3	28 39.2	80.3	29 06.6	79.3	40
30	29 18.0	84.6	29 46.5	83.6	30 14.5	82.5	30 41.9	81.5	31 08.9	80.5	30
20	31 21.9	85.9	31 50.2	84.8	32 17.9	83.8	32 45.1	82.7	33 11.8	81.7	20
10	33 26.0	87.2	33 54.2	86.1	34 21.7	85.1	34 48.6	84.0	35 15.0	82.9	10
4 00	35 30.3	88.5	35 58.3	87.4	36 25.7	86.3	36 52.6	85.2	37 18.7	84.1	4 00
3 50	37 34.7	89.9	38 02.6	88.8	38 29.8	87.7	38 56.5	86.5	39 22.4	85.4	3 50
40	39 39.0	91.3	40 06.9	90.2	40 34.2	89.0	41 00.8	87.8	41 26.5	86.6	40
30	41 43.3	92.8	42 11.2	91.6	42 38.4	90.4	43 04.9	89.2	43 30.7	87.9	30
20	43 47.4	94.3	44 15.6	93.1	44 43.0	91.8	45 09.5	90.6	45 35.1	89.3	20
10	45 51.2	95.9	46 19.6	94.6	46 47.1	93.3	47 13.7	92.0	47 39.2	90.7	10
3 00	47 54.7	97.6	48 23.3	96.2	48 51.1	94.9	49 18.0	93.5	49 43.7	92.2	3 00
2 50	49 57.7	99.3	50 26.7	97.9	50 54.7	96.5	51 21.7	95.1	51 48.0	93.7	2 50
40	52 00.2	101.1	52 29.6	99.7	52 58.2	98.3	53 25.7	96.8	53 51.9	95.3	40
30	54 01.6	103.1	54 31.8	101.6	55 00.9	100.1	55 28.7	98.6	55 55.4	97.0	30
20	56 02.3	105.2	56 33.2	103.7	57 03.0	102.1	57 31.6	100.5	57 58.8	98.9	20
10	58 01.6	107.6	58 33.2	105.9	59 04.0	104.3	59 33.4	102.6	60 01.2	100.9	10
2 00	59 59.4	110.1	60 32.3	108.4	61 03.9	106.6	61 34.2	104.8	62 02.9	103.0	2 00
1 50	61 55.1	112.8	62 29.2	111.0	63 02.2	109.2	63 33.6	107.3	64 03.5	105.4	1 50
40	63 48.4	115.9	64 24.1	114.0	64 58.6	112.1	65 31.6	110.1	66 02.7	108.0	40
30	65 38.6	119.3	66 16.1	117.4	66 52.4	115.4	67 27.0	113.3	67 59.6	111.1	30
20	67 25.0	123.2	68 04.6	121.2	68 43.0	119.1	69 19.8	116.9	69 54.5	114.6	20
10	69 06.2	127.6	69 48.5	125.6	70 29.1	123.4	71 08.2	121.1	71 45.5	118.6	10
1 00	70 41.5	132.7	71 26.4	130.7	72 10.1	128.4	72 52.3	126.0	73 32.3	123.4	1 00
0 50	72 08.7	138.4	72 56.7	136.5	73 43.5	134.3	74 28.7	131.9	75 12.2	129.2	0 50
40	73 25.8	145.0	74 16.9	143.2	75 07.3	141.2	75 56.5	138.9	76 43.8	136.3	40
30	74 30.2	152.6	75 24.5	151.1	76 18.2	149.2	77 11.2	147.2	78 03.0	144.8	30
20	75 18.9	161.1	76 16.3	160.0	77 13.3	158.6	78 09.9	157.0	79 05.5	155.1	20
10	75 49.5	170.3	76 48.8	169.7	77 48.0	169.0	78 47.0	168.1	79 45.9	167.0	10
0 00	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	80 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 04.3	91.4	1 30.7	92.2	0 57.1	93.1	0 23.6	93.9			5 50
40	4 08.6	92.8	3 35.0	93.6	3 01.2	94.5	2 27.5	95.3	1 53.7	96.1	40
30	6 12.8	94.2	5 38.9	95.0	5 05.1	95.9	4 31.2	96.7	3 57.2	97.5	30
20	8 16.6	95.6	7 42.6	96.5	7 08.6	97.3	6 34.4	98.1	6 00.2	99.0	20
10	10 20.3	97.0	9 46.1	97.9	9 11.8	98.7	8 37.5	99.5	8 02.9	100.4	10
5 00	12 23.4	98.5	11 49.0	99.4	11 14.4	100.2	10 39.8	101.0	10 04.9	101.9	5 00
4 50	14 26.1	100.0	13 51.3	100.8	13 16.6	101.7	12 41.5	102.5	12 06.3	103.4	4 50
40	16 28.3	101.5	15 53.2	102.3	15 17.9	103.2	14 42.5	104.0	14 06.8	104.9	40
30	18 29.9	103.0	17 54.4	103.9	17 18.7	104.7	16 42.8	105.6	16 06.6	106.4	30
20	20 30.6	104.6	19 54.7	105.5	19 18.5	106.3	18 42.1	107.2	18 05.4	108.0	20
10	22 30.5	106.2	21 54.1	107.1	21 17.3	107.9	20 40.3	108.8	20 03.1	109.6	10
4 00	24 29.4	107.9	23 52.4	108.8	23 15.1	109.6	22 37.5	110.5	21 59.6	111.3	4 00
3 50	26 27.1	109.6	25 49.5	110.5	25 11.6	111.3	24 33.3	112.2	23 54.8	113.0	3 50
40	28 23.6	111.4	27 45.3	112.3	27 06.7	113.1	26 27.8	114.0	25 48.5	114.8	40
30	30 18.6	113.2	29 39.6	114.1	29 00.2	115.0	28 20.6	115.8	27 40.5	116.7	30
20	32 12.1	115.1	31 32.3	116.0	30 52.0	116.9	30 11.5	117.7	29 30.6	118.6	20
10	34 03.7	117.1	33 23.1	118.0	32 42.0	118.9	32 00.7	119.7	31 18.9	120.6	10
3 00	35 53.4	119.2	35 11.8	120.1	34 29.8	121.0	33 47.4	121.8	33 04.7	122.7	3 00
2 50	37 40.7	121.4	36 58.1	122.3	36 15.2	123.2	35 31.8	124.0	34 48.1	124.9	2 50
40	39 25.5	123.7	38 41.9	124.6	37 57.9	125.4	37 13.5	126.3	36 28.8	127.1	40
30	41 07.5	126.1	40 22.9	127.0	39 37.8	127.8	38 52.2	128.7	38 06.3	129.5	30
20	42 46.1	128.6	42 00.5	129.5	41 14.2	130.3	40 27.5	131.2	39 40.5	132.0	20
10	44 21.7	131.3	43 34.8	132.1	42 47.2	133.0	41 59.4	133.8	41 11.1	134.6	10
2 00	45 53.2	134.1	45 04.9	134.9	44 16.1	135.8	43 27.0	136.6	42 37.6	137.3	2 00
1 50	47 20.2	137.1	46 30.6	137.9	45 40.6	138.7	44 50.2	139.5	43 59.6	140.2	1 50
40	48 42.5	140.2	47 51.5	141.0	47 00.2	141.7	46 08.5	142.5	45 16.6	143.2	40
30	49 59.3	143.5	49 07.2	144.2	48 14.6	145.0	47 21.6	145.7	46 28.5	146.4	30
20	51 10.4	146.9	50 16.8	147.6	49 22.8	148.3	48 28.6	149.0	47 34.3	149.6	20
10	52 14.8	150.6	51 20.0	151.2	50 24.9	151.8	49 29.5	152.5	48.34 1	153.1	10
1 00	53 12.3	154.4	52 16.2	155.0	51 19.9	155.5	50 23.5	156.1	49 27.0	156.6	1 00
0 50	54 02.2	158.4	53 05.1	158.9	52 07.6	159.4	51 10.2	159.9	50 12.8	160.3	0 50
40	54 43.8	162.5	53 45.7	162.9	52 47.4	163.3	51 49.1	163.7	50 50.7	164.1	40
30	55 16.8	166.8	54 18.0	167.1	53 19.0	167.4	52 19.9	167.7	51 20.9	168.0	30
20	55 40.7	171.1	54 41.2	171.3	53 41.7	171.5	52 42.1	171.7	51 42.5	171.9	20
10	55 55.2	175.5	54 55.1	175.7	53 54.9	175.8	52 54.8	175.9	51 54.6	176.0	10
0 00	56 0.0	180.0	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 19.9	96.9	0 46.1	97.8	0 12.2	98.6					5 40
30	3 23.2	98.3	2 49.1	99.2	2 15.0	100.0	1 40.8	100.8	1 06.8	101.6	30
20	5 25.9	99.8	4 51.6	100.6	4 17.2	101.4	3 42.7	102.2	3 08.2	103.0	20
10	7 28.3	101.2	6 53.7	102.0	6 18.7	102.8	5 43.9	103.6	5 09.1	104.5	10
5 00	9 29.9	102.7	8 54.8	103.5	8 19.6	104.3	7 44.3	105.1	7 08.9	106.0	5 00
4 50	11 30.8	104.2	10 55.3	105.0	10 19.7	105.8	9 44.0	106.6	9 08.1	107.5	4 50
40	13 31.0	105.7	12 55.0	106.5	12 18.9	107.3	11 42.6	108.1	11 06.2	109.0	40
30	15 30.2	107.2	14 53.8	108.1	14 17.1	108.9	13 40.2	109.7	13 03.3	110.5	30
20	17 28.6	108.8	16 51.5	109.7	16 14.2	110.5	15 36.8	111.3	14 59.2	112.1	20
10	19 25.6	110.4	18 48.0	111.3	18 10.0	112.1	17 31.9	112.9	16 53.7	113.7	10
4 00	21 21.5	112.1	20 43.1	113.0	20 04.5	113.8	19 25.7	114.6	18 46.8	115.4	4 00
3 50	23 16.0	113.8	22 37.0	114.7	21 57.6	115.5	21 18.1	116.3	20 45.8	117.1	3 50
40	25 09.0	115.6	24 29.1	116.5	23 49.0	117.3	23 08.6	118.1	22 28.1	118.9	40
30	27 00.2	117.5	26 19.6	118.3	25 38.5	119.1	24 57.4	120.0	24 16.2	120.7	30
20	28 49.5	119.4	28 08.0	120.2	27 26.2	121.0	26 44.2	121.9	26 01.9	122.6	20
10	30 36.8	121.4	29 54.2	122.2	29 11.6	123.0	28 28.7	123.9	27 45.5	124.6	10
3 00	32 21.7	123.5	31 38.3	124.3	30 54.6	125.1	30 10.6	125.9	29 26.4	126.7	3 00
2 50	34 04.0	125.7	33 19.6	126.5	32 35.0	127.3	31 50.0	128.1	31 04.7	128.8	2 50
40	35 43.7	127.9	34 58.2	128.7	34 12.4	129.5	33 26.3	130.3	32 40.1	131.0	40
30	37 20.1	130.3	36 33.6	131.1	35 46.7	131.9	34 59.7	132.6	34 12.2	133.4	30
20	38 53.2	132.8	38 05.5	133.5	37 17.5	134.3	36 29.3	135.0	35 40.8	135.8	20
10	40 22.6	135.4	39 33.8	136.1	38 44.6	136.9	37 55.2	137.6	37 05.6	138.3	10
2 00	41 47.9	138.1	40 57.8	138.8	40 07.5	139.5	39 16.9	140.2	38 26.1	140.9	2 00
1 50	43 08.6	140.9	42 17.4	141.6	41 25.9	142.3	40 34.2	143.0	39 42.3	143.7	1 50
40	44 24.4	143.9	43 32.0	144.6	42 39.4	145.2	41 46.5	145.9	40 53.5	146.5	40
30	45 35.0	147.0	44 41.4	147.6	43 47.6	148.2	42 53.6	148.9	41 59.5	149.5	30
20	46 39.8	150.2	45 45.0	150.8	44 50.1	151.4	43 55.0	152.0	42 59.8	152.5	20
10	47 38.4	153.6	46 42.6	154.2	45 46.6	154.7	44 50.5	155.2	43 54.3	155.7	10
1 00	48 30.3	157.1	47 33.4	157.6	46 36.5	158.0	45 39.4	158.5	44 42.2	158.9	1 00
0 50	49 15.0	160.7	48 17.2	161.1	47 19.4	161.5	46 21.5	161.9	45 23.6	162.3	0 50
40	49 52.2	164.4	48 53.7	164.8	47 55.1	165.1	46 56.5	165.4	45 57.8	165.7	40
30	50 21.7	168.2	49 22.5	168.5	48 23.3	168.7	47 24.1	168.9	46 24.9	169.2	30
20	50 42.9	172.1	49 43.2	172.3	48 43.6	172.5	47 43.9	172.6	46 44.3	172.8	20
10	50 55.8	176.0	49 55.8	176.1	48 55.9	176.2	47 56.0	176.3	46 56.1	176.4	10
0 00	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 32.5	102.5									5 30
20	2 33.6	103.9	1 59.0	104.7	1 24.4	105.5	0 49.8	106.3	0 15.2	107.1	20
10	4 33.9	105.3	3 58.9	106.1	3 23.9	106.9	2 48.8	107.7	2 13.6	108.5	10
5 00	6 33.5	106.8	5 57.9	107.6	5 22.3	108.4	4 46.6	109.2	4 10.9	110.0	5 00
4 50	8 32.1	108.3	7 55.9	109.1	7 19.9	109.9	6 43.7	110.7	6 07.4	111.5	4 50
40	10 29.6	109.8	9 53.0	110.6	9 16.2	111.4	8 39.8	112.2	8 02.3	113.0	40
30	12 26.2	111.3	11 48.8	112.1	11 11.5	112.9	10 33.8	113.7	9 56.1	114.5	30
20	14 21.4	112.9	13 43.4	113.7	13 05.3	114.5	12 27.1	115.3	11 48.7	116.1	20
10	16 15.3	114.5	15 36.5	115.3	14 57.7	116.1	14 18.7	116.9	13 39.6	117.7	10
4 00	18 07.5	116.2	17 28.2	117.0	16 48.6	117.8	16 08.8	118.5	15 28.9	119.3	4 00
3 50	19 58.4	117.9	19 18.2	118.7	18 37.7	119.5	17 57.1	120.2	17 16.4	121.0	3 50
40	21 47.3	119.7	21 06.3	120.5	20 25.1	121.3	19 43.7	122.0	19 02.0	122.8	40
30	23 34.4	121.5	22 52.6	122.3	22 10.4	123.1	21 28.1	123.8	20 45.5	124.6	30
20	25 19.3	123.4	24 36.5	124.2	23 53.4	125.0	23 10.2	125.7	22 26.7	126.5	20
10	27 01.9	125.4	26 18.1	126.2	25 34.2	127.0	24 49.8	127.7	24 05.4	128.4	10
3 00	28 41.9	127.5	27 57.2	128.2	27 12.2	129.0	26 27.0	129.7	25 41.5	130.4	3 00
2 50	30 19.2	129.6	29 33.5	130.3	28 47.5	131.1	28 01.2	131.8	27 14.7	132.5	2 50
40	31 53.5	131.8	31 06.7	132.5	30 19.7	133.2	29 32.4	134.0	28 44.8	134.7	40
30	33 24.6	134.1	32 36.7	134.8	31 48.6	135.5	31 00.3	136.2	30 11.6	136.9	30
20	34 52.0	136.5	34 03.0	137.2	33 13.8	137.9	32 24.4	138.5	31 34.7	139.2	20
10	36 15.7	139.0	35 25.6	139.7	34 35.2	140.4	33 44.6	141.0	32 53.9	141.6	10
2 00	37 35.1	141.6	36 43.9	142.2	35 52.5	142.9	35 00.9	143.5	34 09.0	144.1	2 00
1 50	38 50.1	144.3	37 57.8	144.9	37 05.3	145.5	36 12.5	146.1	35 19.7	146.7	1 50
40	40 00.2	147.1	39 06.8	147.7	38 13.2	148.3	37 19.4	148.8	36 25.5	149.4	40
30	41 05.2	150.0	40 10.6	150.6	39 16.0	151.1	38 21.2	151.6	37 26.2	152.2	30
20	42 05.4	153.0	41 09.0	153.5	40 13.4	154.0	39 17.7	154.5	38 12.8	155.0	20
10	42 57.9	156.2	42 01.5	156.6	41 04.9	157.0	40 08.1	157.5	39 11.5	157.9	10
1 00	43 45.0	159.4	42 47.7	159.7	41 50.3	160.1	40 52.8	160.5	39 55.2	160.9	1 00
0 50	44 25.5	162.6	43 27.4	162.9	42 29.3	163.3	41 31.1	163.6	40 32.8	164.0	0 50
40	44 59.1	166.0	44 00.4	166.3	43 01.6	166.6	42 02.8	166.8	41 03.9	167.1	40
30	45 25.6	169.4	44 26.3	169.7	43 27.0	169.9	42 27.7	170.1	41 28.4	170.3	30
20	45 44.6	172.9	44 45.0	173.1	43 45.3	173.2	42 45.6	173.4	41 45.9	173.5	20
10	45 56.1	176.5	44 56.2	176.5	43 56.3	176.6	42 56.1	176.7	41 56.5	176.7	10
0 00	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 38.3	109.4	1 03.1	110.2	0 27.8	111.0					5 10
5 00	3 35.1	110.8	2 59.3	111.6	2 23.4	112.4	1 47.5	113.2	1 11.6	114.0	5 00
4 50	5 30.8	112.3	4 54.3	113.0	4 17.8	113.8	3 41.1	114.6	3 04.6	115.4	4 50
40	7 25.3	113.8	6 48.1	114.5	6 10.9	115.3	5 33.6	116.1	4 56.2	116.9	40
30	9 18.4	115.3	8 40.5	116.0	8 02.5	116.8	7 24.5	117.6	6 46.3	118.4	30
20	11 10.1	116.8	10 31.5	117.6	9 52.8	118.4	9 13.9	119.2	8 34.9	119.9	20
10	13 00.3	118.4	12 20.8	119.2	11 41.2	120.0	11 01.6	120.8	10 21.8	121.5	10
4 00	14 49.1	120.1	14 08.5	120.9	13 28.1	121.6	12 47.5	122.4	12 06.9	123.1	4 00
3 50	16 35.5	121.8	15 54.6	122.6	15 13.1	123.3	14 31.8	124.1	13 50.2	124.8	3 50
40	18 20.2	123.5	17 38.2	124.3	16 56.0	125.0	16 13.6	125.8	15 31.1	126.5	40
30	20 02.8	125.3	19 19.8	126.1	18 36.7	126.8	17 53.4	127.6	17 10.0	128.3	30
20	21 43.0	127.2	20 59.1	127.9	20 15.0	128.7	19 30.7	129.4	18 46.3	130.1	20
10	23 20.8	129.1	22 35.8	129.8	21 50.8	130.6	21 05.6	131.3	20 20.2	132.0	10
3 00	24 55.9	131.1	24 10.0	131.8	23 23.9	132.5	22 37.6	133.2	21 51.2	133.9	3 00
2 50	26 28.0	133.2	25 41.0	133.9	24 54.0	134.6	24 06.7	135.3	23 19.2	135.9	2 50
40	27 57.1	135.3	27 09.1	136.0	26 21.0	136.7	25 32.7	137.4	24 44.2	138.0	40
30	29 23.8	137.6	28 33.7	138.2	27 44.5	138.9	26 55.1	139.6	26 05.6	140.2	30
20	30 44.8	139.9	29 54.7	140.5	29 04.5	141.1	28 14.0	141.8	27 23.4	142.4	20
10	32 02.9	142.3	31 11.8	142.9	30 20.5	143.5	29 29.0	144.1	28 37.4	144.7	10
2 00	33 17.0	144.7	32 24.8	145.3	31 32.5	145.9	30 40.0	146.4	29 47.4	147.0	2 00
1 50	34 26.6	147.3	33 33.3	147.8	32 39.9	148.4	31 46.5	148.9	30 52.8	149.4	1 50
40	35 31.4	149.9	34 37.2	150.4	33 42.8	150.9	32 48.3	151.4	31 53.7	151.9	40
30	36 31.1	152.6	35 35.9	153.1	34 40.7	153.6	33 45.2	154.0	32 49.8	154.5	30
20	37 25.8	155.4	36 29.7	155.9	35 33.5	156.3	34 37.2	156.7	33 40.8	157.1	20
10	38 14.5	158.3	37 17.6	158.7	36 20.6	159.1	35 23.6	159.5	34 26.4	159.8	10
1 00	38 57.6	161.3	37 59.9	161.6	37 02.1	161.9	36 04.3	162.3	35 06.4	162.6	1 00
0 50	39 34.4	164.3	38 36.0	164.6	37 37.7	164.8	36 39.2	165.1	35 40.7	165.4	0 50
40	40 05.0	167.3	39 06.1	167.6	38 07.1	167.8	37 08.1	168.0	36 09.1	168.3	40
30	40 29.0	170.4	39 29.5	170.6	38 30.1	170.8	37 30.7	171.0	36 31.2	171.2	30
20	40 46.1	173.6	39 46.4	173.7	38 46.7	173.9	37 46.9	174.0	36 47.2	174.1	20
10	40 56.5	176.8	39 56.6	176.8	38 56.7	176.9	37 56.8	177.0	36 56.8	177.0	10
0 00	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 35.7	114.8									5 00
4 50	2 27.9	116.2	1 51.2	117.0	1 14.5	117.8	0 37.7	118.6	0 01.1	119.4	4 50
40	4 18.8	117.7	3 41.3	118.5	3 03.8	119.3	2 26.2	120.0	1 48.6	120.8	40
30	6 08.1	119.2	5 29.8	120.0	4 51.5	120.7	4 13.1	121.5	3 34.6	122.2	30
20	7 55.9	120.7	7 16.8	121.5	6 37.5	122.2	5 58.3	123.0	5 18.9	123.7	20
10	9 41.8	122.3	9 02.0	123.0	8 21.8	123.8	7 41.6	124.5	7 01.3	125.2	10
4 00	11 26.1	123.9	10 45.3	124.6	10 04.3	125.4	9 23.2	126.1	8 42.0	126.8	4 00
3 50	13 08.4	125.5	12 26.6	126.3	11 44.6	127.0	11 02.6	127.7	10 20.4	128.4	3 50
40	14 48.5	127.2	14 05.7	128.0	13 22.8	128.7	12 39.8	129.4	11 56.7	130.1	40
30	16 26.3	129.0	15 42.6	129.7	14 58.7	130.4	14 14.7	131.1	13 30.7	131.8	30
20	18 01.7	130.8	17 17.0	131.5	16 32.1	132.2	15 47.1	132.9	15 02.0	133.6	20
10	19 34.5	132.7	18 48.8	133.4	18 03.0	134.0	17 17.0	134.7	16 30.7	135.4	10
3 00	21 04.6	134.6	20 17.9	135.3	19 30.9	135.9	18 43.9	136.6	17 56.7	137.2	3 00
2 50	22 31.6	136.6	21 43.8	137.3	20 55.8	137.9	20 07.7	138.5	19 19.7	139.1	2 50
40	23 55.5	138.6	23 06.7	139.3	22 17.7	139.9	21 28.6	140.5	20 39.3	141.1	40
30	25 15.8	140.8	24 26.0	141.4	23 36.1	142.0	22 45.9	142.6	21 55.5	143.1	30
20	26 32.7	143.0	25 41.8	143.5	24 50.8	144.1	23 59.7	144.7	23 08.4	145.2	20
10	27 45.7	145.2	26 53.7	145.8	26 01.7	146.3	25 09.6	146.9	24 17.2	147.4	10
2 00	28 54.6	147.5	28 01.7	148.1	27 08.6	148.6	26 15.5	149.1	25 22.2	149.6	2 00
1 50	29 59.1	149.9	29 05.2	150.4	28 11.2	150.9	27 17.1	151.4	26 23.0	151.9	1 50
40	30 59.0	152.4	30 04.2	152.9	29 09.3	153.3	28 14.3	153.8	27 19.2	154.2	40
30	31 54.2	154.9	30 58.5	155.4	30 02.7	155.8	29 06.9	156.2	28 10.8	156.6	30
20	32 44.3	157.5	31 47.8	157.9	30 51.2	158.3	29 54.5	158.7	28 57.8	159.1	20
10	33 29.1	160.2	32 31.8	160.5	31 34.5	160.9	30 37.1	161.2	29 39.6	161.6	10
1 00	34 08.5	162.9	33 10.6	163.2	32 12.5	163.5	31 14.5	163.8	30 16.4	164.1	1 00
0 50	34 42.2	165.7	33 43.7	165.9	32 45.0	166.2	31 46.4	165.5	30 47.7	166.7	0 50
40	35 10.0	168.5	34 10.9	168.7	33 11.8	168.9	32 12.7	169.1	31 13.5	169.3	40
30	35 31.7	171.3	34 32.3	171.5	33 32.8	171.6	32 33.3	171.8	31 33.8	171.9	30
20	35 47.4	174.2	34 47.6	174.3	33 47.9	174.4	32 48.1	174.5	31 48.3	174.6	20
10	35 56.8	177.1	34 56.9	177.2	33 57.0	177.2	32 57.1	177.3	31 57.6	177.3	10
0 00	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 15.1	85.3	6 10
6 00	0 00.0	90.0	0 34.4	89.2	1 08.9	88.4	1 43.2	87.6	2 17.6	86.7	6 00
5 50	2 02.9	91.4	2 37.4	90.6	3 11.8	89.8	3 46.0	89.0	4 20.3	88.2	5 50
40	4 05.6	92.9	4 40.1	92.0	5 14.6	91.2	5 49.1	90.4	6 23.2	89.6	40
30	6 08.3	94.3	6 42.9	93.5	7 17.4	92.7	7 51.8	91.8	8 26.0	91.0	30
20	8 10.7	95.8	8 45.4	95.0	9 20.0	94.2	9 54.5	93.3	10 28.9	92.5	20
10	10 12.8	97.2	10 47.8	96.4	11 22.5	95.6	11 57.1	94.7	12 31.6	93.9	10
5 00	12 14.4	98.7	12 49.6	97.9	13 24.6	97.1	13 59.6	96.2	14 34.1	95.4	5 00
4 50	14 15.6	100.2	14 51.1	99.4	15 26.3	98.6	16 01.3	97.7	16 36.2	96.9	4 50
40	16 16.2	101.8	16 52.0	101.0	17 27.6	100.1	18 02.9	99.3	18 38.0	98.4	40
30	18 16.1	103.4	18 52.2	102.5	19 28.2	101.7	20 03.9	100.8	20 39.2	99.9	30
20	20 15.3	105.0	20 51.8	104.1	21 28.1	103.3	22 04.2	102.4	22 40.0	101.5	20
10	22 13.5	106.6	22 50.6	105.8	23 27.3	104.9	24 03.8	104.0	24 39.9	103.2	10
4 00	24 10.7	108.3	24 48.3	107.5	25 25.6	106.6	26 02.6	105.7	26 39.2	104.9	4 00
3 50	26 06.7	110.1	26 44.9	109.2	27 22.8	108.3	28 00.2	107.5	28 37.4	106.6	3 50
40	28 01.5	111.9	28 40.3	111.0	29 18.8	110.1	29 57.0	109.3	30 34.7	108.4	40
30	29 54.7	113.8	30 34.2	112.9	31 13.3	112.0	31 52.2	111.1	32 30.7	110.2	30
20	31 46.3	115.7	32 26.7	114.8	33 06.6	113.9	33 46.2	113.0	34 25.3	112.1	20
10	33 36.1	117.7	34 17.2	116.9	34 58.0	116.0	35 38.3	115.1	36 18.2	114.1	10
3 00	35 23.8	119.8	36 05.8	119.0	36 47.5	118.1	37 28.7	117.2	38 09.5	116.2	3 00
2 50	37 09.1	122.1	37 52.2	121.3	38 34.8	120.3	39 16.9	119.4	39 58.6	118.4	2 50
40	38 52.0	124.4	39 36.0	123.5	40 19.6	122.6	41 02.8	121.7	41 45.6	120.7	40
30	40 31.9	126.8	41 17.1	125.9	42 01.7	125.0	42 45.9	124.1	43 29.7	123.1	30
20	42 08.7	129.3	42 54.9	128.5	43 40.8	127.6	44 26.2	126.7	45 11.2	125.7	20
10	43 41.9	132.0	44 29.3	131.2	45 16.3	130.3	46 03.0	129.4	46 49.2	128.4	10
2 00	45 11.2	134.8	45 59.8	134.0	46 48.1	133.1	47 36.0	132.2	48 23.5	131.3	2 00
1 50	46 36.0	137.8	47 26.0	137.0	48 15.6	136.1	49 04.8	135.2	49 53.6	134.4	1 50
40	47 56.2	140.9	48 47.3	140.1	49 38.2	139.3	50 28.8	138.5	51 19.0	137.6	40
30	49 10.9	144.2	50 03.5	143.4	50 55.8	142.6	51 47.6	141.9	52 39.1	141.0	30
20	50 19.9	147.6	51 13.7	146.9	52 07.2	146.2	53 00.5	145.4	53 53.4	144.6	20
10	51 22.3	151.2	52 17.5	150.6	53 12.4	149.9	54 06.8	149.2	55 01.1	148.5	10
1 00	52 18.1	155.0	53 14.2	154.4	54 10.3	153.8	55 06.1	153.2	56 01.7	152.5	1 00
0 50	53 06.3	158.9	54 03.5	158.4	55 00.8	157.8	55 57.6	157.3	56 54.5	156.7	0 50
40	53 46.5	162.9	54 44.7	162.5	55 42.8	162.1	56 40.9	161.6	57 38.8	161.1	40
30	54 18.4	167.1	55 17.4	166.8	56 16.2	166.4	57 15.0	166.0	58 13.9	165.6	30
20	54 41.4	171.3	55 41.0	171.1	56 40.6	170.9	47 40.0	170.6	58 39.5	170.4	20
10	54 55.3	175.6	55 55.2	175.5	56 55.1	175.4	57 55.0	175.3	58 54.9	175.2	10
0 00	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 31.4	80.6	1 06.1	79.8	6 20
10	0 49.5	84.5	1 24.0	83.7	1 58.4	82.8	2 32.9	82.0	3 07.3	81.2	10
6 00	2 51.9	85.9	3 26.2	85.1	4 00.5	84.2	4 34.7	83.4	5 08.8	82.6	6 00
5 50	4 54.6	87.3	5 28.9	86.5	6 02.9	85.7	6 37.0	84.8	7 10.9	84.0	5 50
40	6 57.4	88.8	7 31.5	87.9	8 05.5	87.1	8 39.4	86.2	9 13.2	85.4	40
30	9 00.3	90.2	9 34.4	89.3	10 08.3	88.5	10 42.1	87.6	11 15.9	86.8	30
20	11 03.1	91.6	11 37.2	90.8	12 11.2	89.9	12 44.9	89.1	13 18.6	88.3	20
10	13 05.9	93.1	13 40.1	92.3	14 14.0	91.4	14 47.9	90.5	15 21.6	89.7	10
5 00	15 08.1	94.5	15 42.8	93.7	16 16.8	92.8	16 50.6	91.9	17 24.3	91.1	5 00
4 50	17 10.8	96.0	17 45.3	95.2	18 19.4	94.3	18 53.4	93.4	19 27.1	92.6	4 50
40	19 12.9	97.5	19 47.5	96.7	20 21.9	95.8	20 55.9	94.9	21 29.8	94.0	40
30	21 14.4	99.1	21 49.3	98.2	22 23.9	97.3	22 58.1	96.4	23 32.3	95.5	30
20	23 15.5	100.7	23 50.7	99.8	24 25.6	98.9	25 00.1	98.0	25 34.3	97.1	20
10	25 15.8	102.3	25 51.5	101.4	26 26.6	100.5	27 01.5	99.6	27 36.1	98.7	10
4 00	27 15.6	104.0	27 51.5	103.1	28 27.1	102.1	29 02.3	101.2	29 37.2	100.3	4 00
3 50	29 14.3	105.7	29 50.8	104.8	30 26.9	103.8	31 02.6	102.9	31 37.8	101.9	3 50
40	31 12.1	107.4	31 49.1	106.5	32 25.7	105.6	33 01.8	104.6	33 37.6	103.7	40
30	33 08.7	109.3	33 46.3	108.3	34 23.5	107.4	35 00.3	106.4	35 36.6	105.5	30
20	35 04.0	111.2	35 42.3	110.2	36 20.2	109.3	36 57.5	108.3	37 34.4	107.3	20
10	36 57.8	113.2	37 36.8	112.2	38 15.4	111.3	38 53.5	110.3	39 31.2	109.3	10
3 00	38 49.8	115.3	39 29.7	114.3	40 09.0	113.3	40 47.9	112.3	41 26.3	111.3	3 00
2 50	40 39.1	117.5	41 20.8	116.5	42 01.0	115.5	42 40.8	114.5	43 20.0	113.5	2 50
40	42 27.8	119.8	43 09.5	118.8	43 50.7	117.8	44 31.4	116.8	45 11.6	115.7	40
30	44 13.0	122.2	44 56.0	121.2	45 38.3	120.2	46 20.1	119.2	47 01.3	118.1	30
20	45 55.6	124.8	46 39.5	123.8	47 23.0	122.8	48 05.9	121.8	48 48.2	120.7	20
10	47 34.8	127.5	48 20.1	126.5	49 04.8	125.5	49 48.9	124.5	50 32.6	123.4	10
2 00	49 10.5	130.4	49 56.8	129.4	50 42.9	128.4	51 28.4	127.4	52 13.3	126.3	2 00
1 50	50 41.9	133.5	51 29.9	132.5	52 17.2	131.5	53 04.0	130.5	53 50.4	129.4	1 50
40	52 08.6	136.7	52 58.0	135.7	53 46.8	134.8	54 35.2	133.8	55 23.0	132.7	40
30	53 30.2	140.1	54 21.0	139.2	55 11.5	138.3	56 01.4	137.3	56 50.9	136.3	30
20	54 46.0	143.8	55 38.2	142.9	56 30.1	142.0	57 21.6	141.1	58 12.5	140.1	20
10	55 55.2	147.7	56 49.0	146.9	57 42.4	146.0	58 35.4	145.2	59 28.1	144.2	10
1 00	56 57.1	151.8	57 52.3	151.1	58 47.2	150.3	59 41.7	149.5	60 35.9	148.6	1 00
0 50	57 51.1	156.1	58 47.5	155.5	59 43.9	154.8	60 40.0	154.1	61 35.8	153.3	0 50
40	58 36.5	160.5	59 34.1	160.1	60 31.6	159.5	61 28.9	158.9	62 26.1	158.3	40
30	59 12.5	165.3	60 11.2	164.9	61 09.9	164.5	62 08.1	164.0	63 06.7	163.5	30
20	59 38.8	170.1	60 38.2	169.8	61 37.5	169.5	62 36.7	169.2	63 36.0	168.9	20
10	59 54.7	175.0	60 54.5	174.9	61 54.4	174.8	62 54.2	174.6	63 54.0	174.4	10
0 00	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 02.5	72.8	6 40
30			0 15.4	76.7	0 50.5	75.9	1 25.5	75.1	2 00.6	74.3	30
20	1 40.7	79.0	2 15.4	78.1	2 49.9	77.3	3 24.6	76.5	3 59.1	75.7	20
10	3 41.6	80.4	4 15.9	79.5	4 50.2	78.7	5 24.4	77.9	5 58.5	77.1	10
6 00	5 43.0	81.8	6 17.0	80.9	6 51.0	80.1	7 24.8	79.3	7 58.6	78.5	6 00
5 50	7 44.8	83.2	8 18.6	82.3	8 52.3	81.5	9 25.8	80.7	9 59.4	79.8	5 50
40	9 46.9	84.6	10 20.5	83.7	10 54.0	82.9	11 27.3	82.1	12 00.4	81.2	40
30	11 49.4	86.0	12 22.8	85.1	12 56.1	84.3	13 29.1	83.4	14 02.1	82.6	30
20	13 52.1	87.4	14 25.4	86.5	14 58.5	85.7	15 31.4	84.8	16 04.1	83.9	20
10	15 54.9	88.8	16 28.1	88.0	17 01.1	87.1	17 33.9	86.2	18 06.4	85.3	10
5 00	17 57.7	90.2	18 30.9	89.4	19 03.8	88.5	19 36.5	87.6	20 08.9	86.7	5 00
4 50	20 00.6	91.7	20 33.9	90.8	21 06.8	89.9	21 39.4	89.0	22 11.7	88.1	4 50
40	22 03.4	93.2	22 36.7	92.3	23 09.6	91.3	23 42.3	90.4	24 14.5	89.5	40
30	24 05.9	94.7	24 39.2	93.7	25 12.4	92.8	25 45.1	91.9	26 17.5	90.9	30
20	26 08.3	96.2	26 41.8	95.2	27 15.0	94.3	27 47.8	93.4	28 20.3	92.4	20
10	28 10.2	97.7	28 43.9	96.8	29 17.5	95.8	29 50.4	94.9	30 23.0	93.9	10
4 00	30 11.7	99.3	30 45.8	98.4	31 19.4	97.4	31 52.6	96.4	32 25.4	95.4	4 00
3 50	32 12.7	100.9	32 47.1	100.0	33 21.0	99.0	33 54.6	98.0	34 27.6	97.0	3 50
40	34 12.9	102.7	34 47.8	101.7	35 22.1	100.7	35 56.0	99.7	36 29.3	98.7	40
30	36 12.3	104.5	36 47.6	103.5	37 22.5	102.4	37 56.8	101.4	38 30.5	100.4	30
20	38 10.8	106.3	38 46.7	105.3	39 22.1	104.2	39 56.8	103.2	40 31.0	102.1	20
10	40 08.2	108.2	40 44.6	107.2	41 20.6	106.1	41 56.0	105.1	42 30.7	104.0	10
3 00	42 04.2	110.3	42 41.4	109.2	43 18.1	108.1	43 54.1	107.0	44 29.4	105.9	3 00
2 50	43 58.6	112.4	44 36.6	111.3	45 14.1	110.2	45 50.8	109.1	46 26.9	108.0	2 50
40	45 51.2	114.6	46 30.2	113.5	47 08.5	112.4	47 46.1	111.3	48 23.1	110.1	40
30	47 41.8	117.0	48 21.8	115.9	49 01.1	114.8	49 39.8	113.6	50 17.6	112.4	30
20	49 30.0	119.6	50 11.1	118.4	50 51.5	117.3	51 31.2	116.1	52 10.2	114.9	20
10	51 15.4	122.3	51 57.8	121.1	52 39.4	120.0	53 20.4	118.8	54 00.7	117.5	10
2 00	52 57.7	125.2	53 41.4	124.0	54 24.4	122.8	55 06.6	121.6	55 48.2	120.3	2 00
1 50	54 36.2	128.3	55 21.2	127.1	56 05.7	125.9	56 49.5	124.7	57 32.5	123.4	1 50
40	56 10.2	131.6	56 57.0	130.5	57 43.1	129.3	58 28.4	128.1	59 13.0	126.8	40
30	57 39.6	135.2	58 28.0	134.1	59 15.7	132.9	60 02.8	131.7	60 49.1	130.4	30
20	59 03.1	139.1	59 53.3	138.0	60 42.8	136.9	61 31.6	135.7	62 19.9	134.4	20
10	60 20.4	143.3	61 12.1	142.2	62 03.3	141.1	62 54.2	139.9	63 44.5	138.7	10
1 00	61 29.9	147.7	62 23.5	146.7	63 16.7	145.7	64 09.3	144.6	65 01.6	143.5	1 00
0 50	62 31.3	152.5	63 26.4	151.6	64 21.5	150.7	65 16.0	149.7	66 10.1	148.7	0 50
40	63 23.2	157.6	64 20.0	156.8	65 16.5	156.0	66 12.8	155.2	67 08.9	154.3	40
30	64 04.7	162.9	65 02.8	162.8	66 01.0	161.7	66 58.8	161.0	67 56.2	160.3	30
20	64 35.3	168.5	65 34.4	168.1	66 33.4	167.6	67 32.5	167.2	68 31.4	166.7	20
10	64 53.8	174.2	65 53.5	174.0	66 53.3	173.8	67 53.1	173.6	68 52.7	173.3	10
0 00	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 00.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 29.6	68.2	1 05.7	67.4	6 50
40	0 38.0	72.0	1 13.4	71.2	1 48.8	70.4	2 24.3	69.6	2 59.7	68.8	40
30	2 33.5	73.5	3 09.6	72.7	3 45.1	71.8	4 20.0	71.0	4 54.8	70.2	30
20	4 33.5	74.9	5 08.0	74.1	5 42.4	73.2	6 16.7	72.4	6 51.0	71.6	20
10	6 32.7	76.2	7 06.6	75.4	7 40.4	74.6	8 15.7	73.7	8 47.9	72.9	10
6 00	8 32.2	77.6	9 05.8	76.8	9 39.2	76.0	10 12.6	75.1	10 45.7	74.3	6 00
5 50	10 31.7	78.9	11 05.7	78.1	11 38.8	77.3	12 11.7	76.4	12 44.4	75.6	5 50
40	12 33.5	80.3	13 06.3	79.5	13 38.9	78.6	14 11.4	77.7	14 43.7	76.9	40
30	14 34.8	81.7	15 07.3	80.8	15 39.7	79.9	16 11.8	79.1	16 43.7	78.2	30
20	16 36.6	83.1	17 08.9	82.2	17 40.9	81.3	18 12.7	80.4	18 44.2	79.5	20
10	18 38.8	84.4	19 10.8	83.5	19 42.6	82.6	20 14.1	81.7	20 45.3	80.8	10
5 00	20 41.1	85.8	21 13.0	84.9	21 44.5	84.0	22 15.8	83.0	22 46.8	82.1	5 00
4 50	22 43.8	87.2	23 15.5	86.3	23 47.0	85.4	24 17.9	84.4	24 48.7	83.4	4 50
40	24 46.6	88.6	25 18.2	87.6	25 49.4	86.7	26 20.3	85.8	26 50.9	84.8	40
30	26 49.4	90.0	27 21.0	89.0	27 52.1	88.1	28 23.1	87.1	28 53.4	86.1	30
20	28 52.3	91.4	29 24.9	90.5	29 55.0	89.5	30 25.8	88.5	30 56.1	87.5	20
10	30 55.1	92.9	31 26.8	91.9	31 58.0	90.9	32 28.6	89.9	32 58.8	88.9	10
4 00	32 57.7	94.4	33 29.4	93.4	34 00.7	92.4	34 31.5	91.3	35 01.8	90.3	4 00
3 50	35 00.1	96.0	35 32.0	95.0	36 03.5	93.9	36 34.3	92.8	37 04.7	91.8	3 50
40	37 02.1	97.6	37 34.3	96.5	38 05.9	95.5	38 37.0	94.4	39 07.4	93.3	40
30	39 03.7	99.3	39 36.1	98.2	40 08.1	97.1	40 39.2	96.0	41 09.9	94.8	30
20	41 04.6	101.0	41 37.5	99.9	42 09.8	98.8	42 41.4	97.6	43 12.3	96.4	20
10	43 04.8	102.8	43 38.1	101.7	44 10.9	100.5	44 42.8	99.3	45 14.1	98.1	10
3 00	45 04.1	104.7	45 38.1	103.6	46 11.2	102.4	46 43.7	101.1	47 15.4	99.9	3 00
2 50	47 02.5	106.8	47 37.0	105.6	48 10.9	104.3	48 43.9	103.1	49 16.0	101.8	2 50
40	48 59.3	108.9	49 34.7	107.7	50 09.3	106.4	50 43.1	105.1	51 16.0	103.8	40
30	50 54.8	111.1	51 31.1	109.9	52 06.5	108.6	52 41.0	107.2	53 14.7	105.9	30
20	52 48.4	113.6	53 25.7	112.3	54 02.1	110.9	54 37.6	109.6	55 12.3	108.1	20
10	54 39.9	116.2	55 18.4	114.9	56 56.0	113.5	56 32.7	112.1	57 08.1	110.6	10
2 00	56 28.8	119.0	57 08.6	117.7	57 47.4	116.2	58 25.3	114.8	59 02.2	113.2	2 00
1 50	58 14.7	122.0	58 56.0	120.7	59 36.0	119.2	60 15.5	117.7	60 53.7	116.1	1 50
40	59 56.9	125.4	60 39.7	124.0	61 21.6	122.5	62 02.7	121.0	62 42.6	119.4	40
30	61 34.7	129.1	62 19.4	127.7	63 03.1	126.2	63 46.0	124.6	64 27.7	122.9	30
20	63 07.4	133.0	63 54.0	131.7	64 39.8	130.2	65 24.7	128.6	66 08.6	126.9	20
10	64 34.0	137.4	65 22.8	136.1	66 10.7	134.6	66 57.8	133.1	67 43.9	131.4	10
1 00	65 53.2	142.3	66 44.1	140.9	67 34.3	139.5	68 23.8	138.0	69 12.5	136.4	1 00
0 50	67 03.8	147.6	67 56.9	146.3	68 49.8	145.0	69 41.5	143.6	70 32.7	142.0	0 50
40	68 04.6	153.3	68 59 8	152.3	69 54.6	151.1	70 49.0	149.8	71 42.8	148.4	40
30	68 53.9	159.5	69 50.9	158.6	70 47.8	157.7	71 44.2	156.7	72 40.5	155.5	30
20	69 30.2	166.1	70 28.8	165.5	71 27.4	164.8	72 25.8	164.1	73 24.0	163.2	20
10	69 52.4	173.0	70 52.1	172.7	71 51.7	172.3	72 51.3	171.9	73 50.8	171.5	10
0 00	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10									0 28.5	60.6	7 10
7 00			0 26.2	64.4	1 02.9	63.6	1 39.6	62.8	2 16.2	62.0	7 00
6 50	1 41.6	66.6	2 17.7	65.8	2 53.6	65.0	3 29.5	64.2	4 05.4	63.4	6 50
40	3 35.0	68.0	4 10.3	67.2	4 45.6	66.4	5 20.9	65.6	5 56.0	64.8	40
30	5 29.5	69.4	6 04.2	68.6	6 38.7	67.7	7 13.2	66.9	7 47.7	66.1	30
20	7 25.1	70.7	7 59 1	69.9	8 33.0	69.1	9 06.9	68.2	9 40.6	67.4	20
10	9 21.5	72.0	9 55.0	71.2	10 28.2	70.4	11 01.4	69.5	11 34.4	68.7	10
6 00	11 18.8	73.4	11 51.7	72.6	12 24.4	71.7	12 57.1	70.8	13 29.5	70.0	6 00
5 50	13 16.9	74.7	13 49.3	73.9	14 21.5	73.0	14 53.5	72.1	15 25.3	71.3	5 50
40	15 15.8	76.0	15 47.7	75.2	16 19.4	74.3	16 50.9	73.4	17 22.1	72.5	40
30	17 15.3	77.3	17 46.8	76.4	18 17.9	75.5	18 48.9	74.6	19 19.7	73.7	30
20	19 15.6	78.6	19 46.6	77.7	20 17.4	76.8	20 47.8	75.9	21 18.0	74.9	20
10	21 16.2	79.9	21 46.9	79.0	22 17.2	78.0	22 47.2	77.1	23 17.0	76.1	10
5 00	23 17.5	81.2	23 47.8	80.3	24 17.7	79.3	24 47.3	78.4	25 16.5	77.4	5 00
4 50	25 19.1	82.5	25 49.1	81.5	26 18.7	80.6	26 47.8	79.6	27 16.8	78.6	4 50
40	27 21.1	83.8	27 50.7	82.8	28 20.1	81.8	28 49.0	80.9	29 17.4	79.9	40
30	29 23.3	85.1	29 52.8	84.1	30 21.9	83.1	30 50.5	82.1	31 18.7	81.1	30
20	31 25.9	86.5	31 55.2	85.5	32 24.1	84.4	32 52.4	83.4	33 20.2	82.3	20
10	33 28.6	87.8	33 57.8	86.8	34 26.5	85.7	34 54.6	84.7	35 22.2	83.6	10
4 00	35 31.5	89.2	36 00.6	88.2	36 29.1	87.1	36 57.2	86.0	37 24.4	84.9	4 00
3 50	37 34.3	90.7	38 03.6	89.6	38 31.9	88.5	38 59.7	87.3	39 26.8	86.2	3 50
40	39 37.1	92.2	40 06.3	91.0	40 34.8	89.9	41 02.6	88.7	41 29.6	87.5	40
30	41 40.1	93.7	42 09.1	92.5	42 37.5	91.3	43 05.4	90.1	43 32.4	88.9	30
20	43 42.4	95.3	44 11.8	94.1	44 40.5	92.8	45 08.4	91.6	45 35.3	90.3	20
10	45 44.5	96.9	46 14.2	95.7	46 43.0	94.4	47 10.9	93.1	47 38.1	91.8	10
3 00	47 46.2	98.6	48 16.2	97.3	48 45.4	96.0	49 13.7	94.7	49 40.9	93.4	3 00
2 50	49 47.4	100.4	50 18.0	99.1	50 47.3	97.8	51 15.9	96.3	51 43.4	95.0	2 50
40	51 47.9	102.4	52 18.9	101.0	52 48.9	99.6	53 18.0	98.1	53 45.7	96.6	40
30	53 47.4	104.5	54 19.0	103.0	54 49.5	101.5	55 19.2	100.0	55 47.4	98.5	30
20	55 45.8	106.7	56 18.2	105.2	56 49.6	103.6	57 19.9	102.0	57 48.7	100.4	20
10	57 42.7	109.1	58 16.2	107.5	58 48.4	105.9	59 19.2	104.2	59 49.1	102.5	10
2 00	59 37.9	111.7	60 12.5	110.0	60 45.8	108.3	61 18.0	106.6	61 48.5	104.8	2 00
1 50	61 30.9	114.5	62 07.0	112.8	62 41.4	111.1	63 14.7	109.2	63 46.5	107.3	1 50
40	63 21.3	117.7	63 58.7	115.9	64 35.0	114.1	65 09.9	112.2	65 43.0	110.2	40
30	65 08.2	121.2	65 47.6	119.4	66 25.5	117.5	67 02.0	115.5	67 37.0	113.4	30
20	66 51.2	125.2	67 32.5	123.3	68 12.7	121.3	68 51.5	119.2	69 28.3	117.0	20
10	68 28.7	129.6	69 12.7	127.7	69 55.0	125.7	70 36.2	123.5	71 15.5	121.2	10
1 00	70 00.0	134.7	70 46.4	132.8	71 31.8	130.8	72 15.9	128.6	72 57.9	126.2	1 00
0 50	71 22.7	140.4	72 12.5	138.5	73 00.7	136.6	73 47.5	134.4	74 33.2	132.1	0 50
40	72 35.8	146.9	73 28.1	145.2	74 19.7	143.4	75 10.4	141.3	75 59.3	139.1	40
30	73 36.2	154.2	74 31.7	152.8	75 26.0	151.2	76 20.2	149.4	77 13.0	147.4	30
20	74 21.9	162.3	75 19.6	161.2	76 17.1	160.1	77 14.1	158.7	78 10.5	157.1	20
10	74 50.3	171.0	75 49.7	170.4	76 49.0	169.8	77 48.2	169.0	78 47.3	168.2	10
0 00	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	79 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 02.9	91.4	1 28.5	92.2	0 54.0	93.1	0 19.5	93.9			5 50
40	4 05.6	92.9	3 31.1	93.7	2 56.7	94.5	2 22.0	95.3	1 47.3	96.1	40
30	6 08.3	94.3	5 33.6	95.1	4 58.9	95.9	4 24.2	96.8	3 49.2	97.6	30
20	8 10.7	95.8	7 35.8	96.6	7 01.0	97.4	6 25.9	98.2	5 50.9	99.1	20
10	10 12.8	97.2	9 37.8	98.1	9 02.6	98.9	8 27.4	99.7	7 52.0	100.5	10
5 00	12 14.4	98.7	11 39.2	99.6	11 03.7	100.4	10 28.2	101.2	9 52.5	102.0	5 00
4 50	14 15.6	100.2	13 40.0	101.1	13 04.2	101.9	12 28.3	102.7	11 52.3	103.5	4 50
40	16 16.2	101.8	15 40.3	102.6	15 04.1	103.5	14 27.8	104.3	13 51.3	105.1	40
30	18 16.1	103.4	17 39.8	104.2	17 03.2	105.1	16 26.6	105.9	15 49.5	106.7	30
20	20 15.3	105.0	19 38.5	105.8	19 01.5	106.7	18 24.2	107.5	17 46.7	108.3	20
10	22 13.5	106.6	21 36.2	107.5	20 58.7	108.3	20 20.9	109.1	19 42.8	110.0	10
4 00	24 10.7	108.3	23 32.9	109.2	22 54.7	110.0	22 16.3	110.8	21 37.6	111.7	4 00
3 50	26 06.7	110.1	25 28.2	110.9	24 49.5	111.8	24 10.5	112.6	23 31.1	113.4	3 50
40	28 01.5	111.9	27 22.3	112.7	26 42.9	113.6	26 03.2	114.4	25 23.1	115.2	40
30	29 54.7	113.8	29 14.9	114.6	28 34.6	115.5	27 54.2	116.3	27 13.3	117.1	30
20	31 46.3	115.7	31 05.7	116.5	30 24.6	117.4	29 43.3	118.3	29 01.7	119.1	20
10	33 36.1	117.7	32 54.6	118.5	32 12.8	119.4	31 30.7	120.3	30 48.1	121.1	10
3 00	35 23.8	119.8	34 41.4	120.7	33 58.6	121.6	33 15.5	122.4	32 32.1	123.2	3 00
2 50	37 09.1	122.1	36 25.8	122.9	35 42.1	123.8	34 58.1	124.6	34 13.6	125.4	2 50
40	38 52.0	124.4	38 07.6	125.2	37 22.9	126.1	36 37.8	126.9	35 52.4	127.7	40
30	40 31.9	126.8	39 46.5	127.6	39 00.6	128.5	38 14.5	129.3	37 27.8	130.1	30
20	42 08.7	129.3	41 22.1	130.2	40 35.2	131.0	39 47.8	131.8	39 00.2	132.6	20
10	43 41.9	132.0	42 54.2	132.8	42 06.0	133.6	41 17.6	134.4	40 28.8	135.2	10
2 00	45 11.2	134.8	44 22.2	135.6	43 32.8	136.4	42 43.2	137.2	41 53.3	137.9	2 00
1 50	46 36.0	137.8	45 45.9	138.6	44 55.2	139.3	44 04.5	140.1	43 13.2	140.8	1 50
40	47 56.2	140.9	47 04.7	141.7	46 12.8	142.4	45 20.7	143.1	44 28.4	143.8	40
30	49 10.9	144.2	48 18.2	144.9	47 25.1	145.6	46 31.9	146.3	45 38.2	146.9	30
20	50 19.9	147.6	49 25.9	148.3	48 31.6	148.9	47 37.1	149.6	46 42.4	150.2	20
10	51 22.3	151.2	50 27.2	151.8	49 31.9	152.4	48 36.2	153.0	47 40.4	153.5	10
1 00	52 18.1	155.0	51 21.7	155.5	50 25.2	156.1	49 28.6	156.6	48 31.8	157.0	1 00
0 50	53 06.3	158.9	52 08.9	159.3	51 11.5	159.8	50 13.9	160.3	49 16.1	160.7	0 50
40	53 46.5	162.9	52 48.3	163.3	51 49.9	163.7	50 51.5	164.1	49 53.0	164.4	40
30	54 18.4	167.1	53 19.4	167.4	52 20.4	167.7	51 21.2	168.0	50 22.1	168.2	30
20	54 41.4	171.3	53 41.9	171.5	52 42.3	171.7	51 42.7	171.9	50 43.1	172.1	20
10	54 55.3	175.6	53 55.5	175.7	52 55.6	175.9	51 55.8	176.0	50 55.8	176.1	10
0 00	55 0.0	180.0	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 12.7	97.0	0 38.0	97.8	0 03.3	98.6					5 40
30	3 14.5	98.4	2 39.5	99.2	2 04.5	100.0	1 29.6	100.8	0 54.6	101.7	30
20	5 15.7	99.9	4 40.5	100.7	4 05.3	101.5	3 29.9	102.3	2 54.6	103.1	20
10	7 16.5	101.3	6 41.0	102.2	6 05.4	103.0	5 29.7	103.8	4 54.0	104.6	10
5 00	9 16.7	102.8	8 40.7	103.7	8 04.7	104.5	7 28.6	105.3	6 52.4	106.1	5 00
4 50	11 16.1	104.3	10 39.8	105.2	10 03.3	106.0	9 26.7	106.8	8 50.0	107.6	4 50
40	13 14.6	105.9	12 37.8	106.7	12 00.9	107.5	11 23.8	108.3	10 46.6	109.1	40
30	15 12.4	107.5	14 35.1	108.3	13 57.6	109.1	13 19.9	109.9	12 42.2	110.7	30
20	17 09.0	109.1	16 31.2	109.9	15 53.1	110.7	15 14.9	111.5	14 36.5	112.3	20
10	19 04.5	110.8	18 26.1	111.6	17 47.4	112.4	17 08.5	113.2	16 29.5	114.0	10
4 00	20 58.7	112.5	20 19.6	113.3	19 40.2	114.1	19 00.6	114.9	18 20.9	115.7	4 00
3 50	22 51.6	114.3	22 11.7	115.1	21 31.7	115.9	20 51.4	116.7	20 10.8	117.4	3 50
40	24 42.8	116.1	24 02.2	116.9	23 21.3	117.7	22 40.2	118.5	21 59.0	119.2	40
30	26 32.2	117.9	25 50.8	118.8	25 09.2	119.6	24 27.4	120.4	23 45.2	121.1	30
20	28 19.8	119.9	27 37.6	120.7	26 55.0	121.5	26 12.3	122.3	25 29.3	123.1	20
10	30 05.2	121.9	29 22.1	122.7	28 38.7	123.5	27 55.1	124.3	27 11.2	125.1	10
3 00	31 48.3	124.0	31 04.2	124.8	30 19.9	125.6	29 35.2	126.4	28 50.3	127.2	3 00
2 50	33 28.8	126.2	32 43.8	127.0	31 58.5	127.7	31 12.9	128.5	30 27.0	129.3	2 50
40	35 06.6	128.5	34 20.5	129.3	33 34.1	130.0	32 47.4	130.8	32 00.5	131.5	40
30	36 41.0	130.9	35 53.9	131.6	35 06.6	132.3	34 18.9	133.1	33 30.9	133.8	30
20	38 12.3	133.4	37 24.1	134.1	36 35.4	134.8	35 46.6	135.6	34 57.6	136.3	20
10	39 39.7	136.0	38 50.2	136.7	38 00.7	137.4	37 10.8	138.1	36 20.7	138.8	10
2 00	41 03.1	138.7	40 12.5	139.4	39 21.7	140.1	38 30.6	140.7	37 39.4	141.4	2 00
1 50	42 21.8	141.6	41 30.2	142.2	40 38.3	142.9	39 46.2	143.5	38 53.8	144.1	1 50
40	43 35.8	144.5	42 43.0	145.1	41 50.0	145.8	40 56.7	146.4	40 03.3	147.0	40
30	44 44.5	147.5	43 50.6	148.1	42 56.5	148.7	42 02.3	149.3	41 07.7	149.9	30
20	45 47.6	150.7	44 52.5	151.3	43 57.3	151.9	43 02.0	152.4	42 06.5	152.9	20
10	46 44.5	154.1	45 48.4	154.6	44 52.3	155.1	43 56.0	155.6	42 59.5	156.1	10
1 00	47 34.9	157.5	46 37.8	158.0	45 40.7	158.4	44 43.5	158.9	43 46.2	159.3	1 00
0 50	48 18.3	161.1	47 20.5	161.5	46 22.4	161.9	45 24.5	162.2	44 26.4	162.6	0 50
40	48 54.4	164.7	47 55.8	165.1	46 57.1	165.4	45 58.4	165.7	44 59.6	166.0	40
30	49 22.9	168.5	48 23.8	168.7	47 24.5	169.0	46 25.2	169.2	45 25.9	169.4	30
20	49 43.5	172.3	48 43.8	172.5	47 44.1	172.6	46 44.4	172.8	45 44.8	172.9	20
10	49 55.8	176.1	48 55.9	176.2	47 56.0	176.3	46 56.1	176.4	45 56.1	176.4	10
0 00	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
											5 30
5 30	0 19.6	102.5									20
20	2 19.2	103.9	1 43.8	104.7	1 08.4	105.5	0 33.0	106.3			10
10	4 18.1	105.4	3 42.2	106.2	3 06.4	107.0	2 30.4	107.8	1 54.4	108.6	
5 00	6 16.1	106.9	5 39.7	107.7	5 03.4	108.5	4 26.9	109.3	3 50.3	110.1	5 00
4 50	8 13.2	108.4	7 36.4	109.2	6 59.4	110.0	6 22.4	110.8	5 45.1	111.6	4 50
40	10 09.3	109.9	9 31.8	110.7	8 54.3	111.5	8 16.6	112.3	7 38.9	113.1	40
30	12 04.3	111.5	11 26.1	112.3	10 48.0	113.1	10 09.7	113.9	9 31.3	114.7	30
20	13 57.9	113.1	13 19.2	113.9	12 40.3	114.7	12 01.4	115.5	11 22.2	116.3	20
10	15 50.1	114.8	15 10.8	115.6	14 31.3	116.3	13 51.6	117.1	13 11.7	117.9	10
4 00	17 40.9	116.5	17 00.8	117.3	16 20.5	118.0	15 40.0	118.8	14 59.4	119.6	4 00
3 50	19 30.1	118.2	18 49.2	119.0	18 08.1	119.8	17 26.9	120.5	16 45.4	121.3	3 50
40	21 17.5	120.0	20 35.7	120.8	19 53.8	121.6	19 11.7	122.3	18 29.4	123.1	40
30	23 02.8	121.9	22 20.2	122.7	21 37.4	123.4	20 54.5	124.2	20 11.2	124.9	30
20	24 46.1	123.8	24 02.6	124.6	23 18.9	125.3	22 35.0	126.1	21 50.9	126.8	20
10	26 26.9	125.8	25 42.5	126.6	24 57.9	127.3	24 13.1	128.1	23 28.0	128.8	10
3 00	28 05.2	127.9	27 19.9	128.6	26 34.3	129.4	25 48.5	130.1	25 02.4	130.8	3 00
2 50	29 40.8	130.0	28 54.5	130.7	28 07.9	131.5	27 21.1	132.2	26 34.0	132.9	2 50
40	31 13.4	132.3	30 26.0	133.0	29 38.4	133.7	28 50.5	134.4	28 02.5	135.0	40
30	32 42.7	134.6	31 54.4	135.3	31 05.5	136.0	30 16.7	136.7	29 27.5	137.3	30
20	34 08.3	137.0	33 18.8	137.6	32 29.1	138.3	31 39.2	139.0	30 49.1	139.6	20
10	35 30.2	139.5	34 39.7	140.1	33 48.9	140.8	32 57.9	141.4	32 06.8	142.0	10
2 00	36 48.0	142.0	35 56.3	142.7	35 04.5	143.3	34 12.5	143.9	33 20.3	144.5	2 00
1 50	38 01.3	144.7	37 08.5	145.3	36 15.7	145.9	35 22.7	146.5	34 29.4	147.0	1 50
40	39 09.7	147.5	38 16.0	148.1	37 22.1	148.7	36 27.9	149.2	35 33.7	149.7	40
30	40 13.1	150.4	39 18.4	151.0	38 23.5	151.5	37 28.4	152.0	36 33.1	152.5	30
20	41 10.9	153.4	40 15.2	153.9	39 19.4	154.4	38 23.4	154.8	37 27.3	155.3	20
10	42 03.0	156.5	41 06.3	156.9	40 09.5	157.4	39 12.5	157.8	38 15.8	158.2	10
1 00	42 48.8	159.7	41 51.4	160.1	40 53.9	160.4	39 56.2	160.8	38 58.5	161.2	1 00
0 50	43 28.2	162.9	42 29.9	163.3	41 31.8	163.6	40 33.5	163.9	39 35.1	164.2	0 50
40	44 00.8	166.2	43 02.0	166.5	42 03.2	166.8	41 04.3	167.0	40 05.4	167.3	40
30	44 26.6	169.6	43 27.3	169.8	42 28.0	170.0	41 28.7	170.2	40 29.1	170.4	30
20	44 45.1	173.1	43 45.4	173.2	42 45.7	173.3	41 46.0	173.4	40 46.3	173.6	20
10	44 56.2	176.5	43 56.4	176.6	42 56.5	176.7	41 56.5	176.7	40 56.5	176.8	10
0 00	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 18.4	109.4	0 42.4	110.2	0 06.4	111.0					5 10
5 00	3 13.8	110.9	2 37.2	111.7	2 00.5	112.4	1 23.9	113.2	0 47.2	114.0	5 00
4 50	5 08.0	112.3	4 30.8	113.2	3 53.5	113.9	3 16.1	114.7	2 38.8	115.5	4 50
40	7 01.0	113.9	6 23.1	114.7	5 45.1	115.4	5 07.1	116.2	4 29.0	117.0	40
30	8 52.7	115.4	8 14.1	116.2	7 35.3	116.9	6 56.7	117.7	6 17.7	118.5	30
20	10 43.1	117.0	10 03.6	117.8	9 24.2	118.5	8 44.6	119.3	8 04.9	120.1	20
10	12 31.7	118.6	11 51.5	119.4	11 11.2	120.1	10 30.9	120.9	9 50.3	121.7	10
4 00	14 18.6	120.3	13 37.6	121.1	12 56.6	121.8	12 15.3	122.6	11 34.0	123.3	4 00
3 50	16 03.8	122.0	15 21.9	122.8	14 40.0	123.5	13 58.0	124.3	13 15.7	125.0	3 50
40	17 46.9	123.8	17 04.3	124.5	16 21.5	125.3	15 38.4	126.0	14 55.3	126.7	40
30	19 27.9	125.6	18 44.4	126.4	18 00.7	127.1	17 16.8	127.8	16 32.7	128.5	30
20	21 06.6	127.5	20 22.1	128.2	19 37.4	128.9	18 52.6	129.7	18 07.5	130.3	20
10	22 42.8	129.5	21 57.3	130.2	21 11.7	130.9	20 25.8	131.6	19 39.9	132.2	10
3 00	24 16.2	131.5	23 29.8	132.2	22 43.2	132.9	21 56.4	133.5	21 09.5	134.2	3 00
2 50	25 46.8	133.6	24 59.4	134.3	24 11.8	134.9	23 24.0	133.6	22 35.9	136.2	2 50
40	27 14.2	135.7	26 25.8	136.4	25 37.2	137.0	24 48.4	137.7	23 59.5	138.3	40
30	28 38.2	137.9	27 48.8	138.6	26 59.1	139.2	26 09.4	139.8	25 19.4	140.4	30
20	29 58.8	140.2	29 08.3	140.9	28 17.7	141.5	27 26.8	142.1	26 35.8	142.7	20
10	31 15.3	142.6	30 23.9	143.2	29 32.1	143.8	28 40.4	144.4	27 48.3	145.0	10
2 00	32 27.9	145.1	31 35.4	145.7	30 42.7	146.2	29 49.9	146.8	28 57.0	147.3	2 00
1 50	33 35.9	147.6	32 42.5	148.2	31 48.7	148.7	30 55.0	149.2	30 01.0	149.7	1 50
40	34 39.4	150.2	33 44.9	150.8	32 50.3	151.3	31 55.5	151.7	31 00.7	152.2	40
30	35 37.8	152.9	34 42.4	153.4	33 46.8	153.9	32 51.3	154.3	31 55.6	154.8	30
20	36 31.1	155.7	35 34.8	156.2	34 38.4	156.6	32 42.0	157.0	32 45.4	157.4	20
10	37 18.8	158.6	36 21.7	159.0	35 24.5	159.4	34 27.3	159.7	33 30.0	160.1	10
1 00	38 00.7	161.5	37 02.9	161.8	36 05.0	162.2	35 07.1	162.5	34 09.1	162.8	1 00
0 50	38 36.6	164.5	37 38.1	164.8	36 39.8	165.1	35 41.2	165.3	34 42.6	165.6	0 50
40	39 06.4	167.5	38 07.5	167.8	37 08.4	168.0	36 09.4	168.2	35 10.3	168.4	40
30	39 29.8	170.6	38 30.1	170.8	37 30.8	170.9	36 31.4	171.1	35 31.9	171.3	30
20	39 46.5	173.7	38 46.8	173.8	37 47.1	173.9	36 47.3	174.1	35 47.5	174.2	20
10	39 56.6	176.8	38 56.8	176.9	37 56.8	176.9	36 56.8	177.0	35 56.8	177.0	10
0 00	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 10.5	114.8									5 00
4 50	2 01.4	116.2	1 23.9	117.0	0 46.5	117.8	0 09.0	118.6			4 50
40	3 50.8	117.7	3 12.6	118.5	2 34.4	119.3	1 56.2	120.1	1 17.9	120.8	40
30	5 38.8	119.2	4 59.8	120.0	4 20.8	120.8	3 41.7	121.6	3 02.6	122.3	30
20	7 25.1	120.8	6 45.3	121.6	6 05.4	122.3	5 25.5	123.1	4 45.5	123.8	20
10	9 09.8	122.4	8 29.2	123.2	7 48.4	123.9	7 07.6	124.7	6 26.7	125.4	10
4 00	10 52.6	124.0	10 11.1	124.8	9 29.4	125.5	8 47.7	126.3	8 05.9	127.0	4 00
3 50	12 33.4	125.7	11 51.1	126.5	11 08.4	127.2	10 25.7	127.9	9 43.0	128.6	3 50
40	14 12.1	127.4	13 28.7	128.2	12 45.2	128.9	12 01.6	129.6	11 18.0	130.3	40
30	15 48.7	129.2	15 04.1	129.9	14 19.7	130.6	13 35.2	131.3	12 50.6	132.0	30
20	17 22.4	131.0	16 37.1	131.7	15 51.7	132.4	15 06.2	133.1	14 20.6	133.8	20
10	18 53.8	132.9	18 07.6	133.6	17 21.2	134.3	16 34.7	134.9	15 48.0	135.6	10
3 00	20 22.3	134.9	19 35.1	135.5	18 47.7	136.2	18 00.2	136.8	17 12.6	137.5	3 00
2 50	21 47.9	136.9	20 59.7	137.5	20 11.2	138.1	19 22.7	138.7	18 34.1	139.4	2 50
40	23 10.3	138.9	22 21.1	139.6	21 31.7	140.2	20 42.2	140.8	19 52.5	141.4	40
30	24 29.3	141.0	23 39.1	141.6	22 48.6	142.2	21 58.2	142.8	21 07.5	143.4	30
20	25 44.7	143.2	24 53.4	143.8	24 02.1	144.4	23 10.6	144.9	22 19.0	145.5	20
10	26 56.3	145.5	26 04.1	146.1	25 11.7	146.6	24 19.2	147.1	23 26.7	147.7	10
2 00	28 03.9	147.8	27 10.6	148.4	26 17.3	148.9	25 23.9	149.4	24 30.4	149.9	2 00
1 50	29 07.1	150.2	28 13.0	150.7	27 18.7	151.2	26 24.3	151.7	25 29.9	152.1	1 50
40	30 05.8	152.7	29 10.8	153.1	28 15.6	153.6	27 20.4	154.0	26 25.1	154.5	40
30	30 59.7	155.2	30 03.9	155.6	29 07.9	156.0	28 11.8	156.4	27 15.8	156.9	30
20	31 48.7	157.8	30 52.1	158.2	29 55.3	158.5	28 58.5	158.9	28 01.7	159.3	20
10	32 32.6	160.4	31 35.2	160.8	30 37.7	161.1	29 40.2	161.4	28 42.7	161.8	10
1 00	33 11.1	163.1	32 13.1	163.4	31 14.9	163.7	30 16.8	164.0	29 18.6	164.3	1 00
0 50	33 44.0	165.8	32 45.4	166.1	31 46.7	166.3	30 48.0	166.6	29 49.3	166.8	0 50
40	34 11.1	168.6	33 12.0	168.8	32 12.9	169.0	31 13.8	169.2	30 14.6	169.4	40
30	34 32.5	171.4	33 33.0	171.6	32 33.4	171.7	31 33.9	171.9	30 34.4	172.0	30
20	34 47.7	174.3	33 47.9	174.4	32 48.2	174.5	31 48.4	174.6	30 48.6	174.7	20
10	34 56.9	177.1	33 57.1	177.2	32 57.1	177.2	31 57.1	177.3	30 57.2	177.4	10
0 00	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 19.9	85.3	6 10
6 00	0 00.0	90.0	0 35.3	89.2	1 10.6	88.4	1 45.8	87.6	2 21.0	86.8	6 00
5 50	2 01.4	91.4	2 36.6	90.6	3 11.9	89.8	3 47.1	89.0	4 22.2	88.2	5 50
40	4 02.6	92.9	4 38.0	92.1	5 13.3	91.3	5 48.5	90.5	6 23.6	89.7	40
30	6 03.7	94.4	6 39.1	93.6	7 14.4	92.8	7 49.8	92.0	8 24.9	91.2	30
20	8 04.6	95.9	8 40.2	95.1	9 15.6	94.3	9 51.0	93.5	10 26.2	92.7	20
10	10 05.1	97.4	10 40.9	96.6	11 16.5	95.8	11 52.0	95.0	12 27.3	94.2	10
5 00	12 05.2	99.0	12 41.2	98.1	13 17.1	97.3	13 52.8	96.5	14 28.3	95.7	5 00
4 50	14 04.8	100.5	14 41.2	99.7	15 17.2	98.8	15 53.2	98.0	16 28.8	97.2	4 50
40	16 03.9	102.1	16 40.5	101.3	17 16.9	100.4	17 53.1	99.6	18 29.0	98.7	40
30	18 02.1	103.7	18 39.1	102.9	19 15.8	102.0	19 52.5	101.2	20 28.7	100.3	30
20	19 59.6	105.3	20 37.0	104.5	21 14.2	103.7	21 51.2	102.8	22 27.8	102.0	20
10	21 56.2	107.0	22 34.0	106.2	23 11.6	105.4	23 48.9	104.5	24 26.2	103.6	10
4 00	23 51.6	108.8	24 30.0	107.9	25 08.2	107.1	25 46.1	106.2	26 23.6	105.3	4 00
3 50	25 45.9	110.6	26 24.9	109.7	27 03.6	108.8	27 42.1	108.0	28 20.1	107.1	3 50
40	27 38.9	112.4	28 18.5	111.5	28 57.9	110.7	29 36.9	109.8	30 15.5	108.9	40
30	29 30.3	114.3	30 10.8	113.4	30 50.7	112.6	31 30.4	111.7	32 09.6	110.8	30
20	31 20.1	116.3	32 01.2	115.4	32 42.0	114.5	33 22.4	113.7	34 02.4	112.8	20
10	33 07.9	118.4	33 49.9	117.5	34 31.5	116.6	35 12.7	115.7	35 53.4	114.8	10
3 00	34 53.6	120.5	35 36.5	119.6	36 19.0	118.7	37 01.0	117.8	37 42.7	116.9	3 00
2 50	36 37.0	122.7	37 20.8	121.8	38 04.2	121.0	38 47.2	120.1	39 29.7	119.2	2 50
40	38 17.8	125.0	39 02.6	124.1	39 47.0	123.3	40 31.0	122.4	41 14.5	121.5	40
30	39 55.7	127.5	40 41.6	126.6	41 27.0	125.8	41 12.9	124.9	42 56.5	124.0	30
20	41 30.4	130.0	42 17.3	129.2	43 03.9	128.3	43 50.1	127.4	44 35.8	126.5	20
10	43 01.4	132.7	43 49.6	131.9	44 37.2	131.0	45 24.7	130.1	46 11.5	129.3	10
2 00	44 28.6	135.5	45 17.9	134.7	46 06.9	133.9	46 55.4	133.0	47 43.6	132.1	2 00
1 50	45 51.3	138.5	46 41.9	137.7	47 32.0	136.9	48 21.9	136.1	49 11.2	135.2	1 50
40	47 09.4	141.6	48 01.1	140.8	48 52.5	140.0	49 43.7	139.2	50 34.4	138.4	40
30	48 22.0	144.9	49 15.1	144.1	50 07.7	143.4	51 00.2	142.6	51 52.1	141.8	30
20	49 29.1	148.2	50 23.2	147.6	51 17.2	146.9	52 10.9	146.2	53 04.3	145.4	20
10	50 29.6	151.8	51 25.1	151.2	52 20.2	150.6	53 15.2	149.9	54 09.9	149.2	10
1 00	51 23.6	155.5	52 20.0	155.0	53 16.3	154.4	54 12.5	153.8	55 08.4	153.1	1 00
0 50	52 10.2	159.3	53 07.7	158.9	54 05.0	158.4	55 02.2	157.9	55 59.2	157.3	0 50
40	52 49.1	163.3	53 47.5	162.9	54 45.8	162.5	55 43.9	162.1	56 42.0	161.6	40
30	53 19.8	167.4	54 18.9	167.1	55 17.9	166.8	56 16.8	166.5	57 15.6	166.1	30
20	53 42.0	171.5	54 41.7	171.3	55 41.3	171.1	56 40.8	170.9	57 40.3	170.7	20
10	53 55.5	175.8	54 55.4	175.6	55 55.3	175.5	56 55.2	175.4	57 55.1	175.3	10
0 00	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

42° 12.0

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 05.7	81.4	0 41.2	80.6	1 16.7	79.8	6 20
10	0 55.2	84.5	1 30.6	83.7	2 05.9	82.9	2 41.2	82.0	3 16.4	81.2	10
6 00	2 56.2	85.9	3 31.3	85.1	4 06.4	84.3	4 41.5	83.5	5 16.5	82.7	6 00
5 50	4 57.3	87.4	5 32.4	86.6	6 07.4	85.8	6 42.2	84.9	7 17.1	84.1	5 50
40	6 58.6	88.9	7 33.6	88.1	8 08.5	87.2	8 43.2	86.4	9 17.9	85.6	40
30	9 00.0	90.3	9 34.8	89.5	10 09.7	88.7	10 44.4	87.8	11 19.0	87.0	30
20	11 01.3	91.8	11 36.3	91.0	12 11.1	90.1	12 45.7	89.3	13 20.3	88.5	20
10	13 02.5	93.3	13 37.6	92.5	14 12.5	91.6	14 47.2	90.8	15 21.6	89.9	10
5 00	15 03.6	94.8	15 38.8	94.0	16 13.7	93.1	16 48.4	92.3	17 23.0	91.4	5 00
4 50	17 04.3	96.3	17 39.7	95.5	18 14.8	94.6	18 49.6	93.8	19 24.2	92.9	4 50
40	19 04.8	97.9	19 40.3	97.0	20 15.6	96.2	20 50.6	95.3	21 25.4	94.4	40
30	21 04.8	99.5	21 40.5	98.6	22 16.0	97.8	22 51.2	96.9	23 26.2	96.0	30
20	23 04.2	101.1	23 40.3	100.2	24 16.1	99.4	24 51.5	98.5	25 26.7	97.6	20
10	25 02.8	102.8	25 39.2	101.9	26 15.5	101.0	26 51.2	100.1	27 26.7	99.2	10
4 00	27 00.8	104.5	27 37.7	103.6	28 14.2	102.7	28 50.4	101.8	29 26.2	100.8	4 00
3 50	28 57.8	106.2	29 35.2	105.3	30 12.3	104.4	30 48.8	103.5	31 25.1	102.5	3 50
40	30 53.8	108.0	31 31.7	107.1	32 09.3	106.2	32 46.4	105.3	33 23.1	104.3	40
30	32 48.5	109.9	33 27.2	109.0	34 05.3	108.1	34 42.9	107.1	35 20.2	106.1	30
20	34 42.0	111.9	35 21.2	110.9	36 00.0	110.0	36 38.3	109.0	37 16.2	108.0	20
10	36 33.8	113.9	37 13.8	113.0	37 53.3	112.0	38 32.3	111.0	39 10.9	110.0	10
3 00	38 23.9	116.0	39 04.6	115.1	39 44.9	114.1	40 24.7	113.1	41 04.1	112.1	3 00
2 50	40 11.8	118.2	40 53.5	117.3	41 34.8	116.3	42 15.5	115.3	42 55.6	114.3	2 50
40	41 57.6	120.6	42 40.2	119.6	43 22.4	118.6	44 04.0	117.6	44 45.1	116.6	40
30	43 40.8	123.0	44 24.5	122.1	45 07.6	121.1	45 50.3	120.1	46 32.5	119.1	30
20	45 21.0	125.6	46 05.8	124.7	46 50.1	123.7	47 33.9	122.7	48 17.2	121.6	20
10	46 57.9	128.3	47 44.0	127.3	48 29.5	126.4	49 14.6	125.4	49 59.0	124.4	10
2 00	48 31.3	131.2	49 18.6	130.3	50 05.3	129.3	50 51.6	128.3	51 37.4	127.3	2 00
1 50	50 00.2	134.3	50 48.9	133.5	51 37.0	132.4	52 24.8	131.4	53 11.9	130.4	1 50
40	51 24.7	137.5	52 14.7	136.7	53 04.2	135.7	53 53.3	134.8	54 41.9	133.8	40
30	52 43.9	141.0	53 35.2	140.1	54 26.2	139.2	55 16.9	138.3	56 06.9	137.3	30
20	53 57.3	144.6	54 50.1	143.8	55 42.6	143.0	56 34.6	142.1	57 26.2	141.1	20
10	55 04.3	148.5	55 58.5	147.7	56 52.2	146.9	57 45.9	146.1	58 39.1	145.2	10
1 00	56 04.1	152.5	56 59.6	151.8	57 54.9	151.1	58 49.8	150.3	59 44.6	149.5	1 00
0 50	56 56.1	156.7	57 52.9	156.1	58 49.4	155.4	59 45.9	154.8	60 42.0	154.1	0 50
40	57 39.9	161.1	58 37.7	160.6	59 35.3	160.1	60 32.8	159.5	61 30.3	158.9	40
30	58 14.4	165.7	59 13.2	165.3	60 12.0	164.9	61 10.6	164.5	62 09.0	164.0	30
20	58 39.7	170.4	59 39.1	170.1	60 38.5	169.8	61 37.7	169.5	62 37.1	169.2	20
10	58 54.9	175.2	59 54.8	175.0	60 54.6	174.8	61 54.5	174.7	62 54.3	174.6	10
0 00	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 20.2	72.9	6 40
30			0 29.2	76.8	1 05.1	76.0	1 40.8	75.1	2 16.7	74.3	30
20	1 52.2	79.0	2 27.7	78.2	3 03.1	77.4	3 38.5	76.6	4 13.9	75.8	20
10	3 51.6	80.4	4 26.7	79.6	5 01.8	78.8	5 36.9	78.0	6 11.9	77.2	10
6 00	5 51.5	81.9	6 26.4	81.1	7 01.2	80.3	7 35.9	79.4	8 10.5	78.6	6 00
5 50	7 51.9	83.3	8 26.4	82.5	9 01.1	81.7	9 35.4	80.9	10 09.8	80.0	5 50
40	9 52.5	84.8	10 27.0	83.9	11 01.3	83.1	11 35.5	82.3	12 09.5	81.4	40
30	11 53.5	86.2	12 27.7	85.4	13 01.8	84.5	13 35.9	83.7	14 10.0	82.8	30
20	13 54.7	87.6	14 28.9	86.8	15 02.9	85.9	15 36.7	85.1	16 10.3	84.2	20
10	15 56.0	89.1	16 30.1	88.3	17 04.0	87.4	17 37.7	86.5	18 11.1	85.6	10
5 00	17 57.3	90.6	18 31.4	89.7	19 05.3	88.8	19 38.9	87.9	20 12.2	87.1	5 00
4 50	19 58.7	92.1	20 32.7	91.2	21 06.7	90.3	21 40.3	89.4	22 13.6	88.5	4 50
40	21 59.9	93.6	22 34.1	92.7	23 08.0	91.8	23 41.6	90.9	24 14.8	90.0	40
30	24 00.8	95.1	24 35.1	94.2	25 09.2	93.3	25 42.2	92.4	26 16.9	91.4	30
20	26 01.6	96.7	26 36.1	95.8	27 10.3	94.8	27 44.1	93.9	28 17.5	92.9	20
10	28 01.9	98.3	28 36.6	97.4	29 11.0	96.4	29 45.0	95.5	30 18.5	94.5	10
4 00	30 01.7	99.9	30 36.8	99.0	31 11.4	98.0	31 45.6	97.1	32 19.4	96.2	4 00
3 50	32 01.0	101.6	32 36.3	100.7	33 11.3	99.7	33 45.8	98.7	34 19.8	97.7	3 50
40	33 59.4	103.4	34 35.3	102.4	35 10.6	101.4	35 45.5	100.4	36 19.9	99.4	40
30	35 57.0	105.2	36 33.3	104.2	37 09.2	103.2	37 44.5	102.2	38 19.2	101.1	30
20	37 53.6	107.1	38 30.5	106.1	39 06.9	105.1	39 42.7	104.0	40 18.0	103.0	20
10	39 49.0	109.1	40 26.5	108.0	41 03.7	107.0	41 39.8	105.9	42 15.8	104.9	10
3 00	41 43.0	111.1	42 21.3	110.1	42 59.0	109.0	43 36.0	107.9	44 12.5	106.8	3 00
2 50	43 35.4	113.3	44 14.4	112.3	44 52.9	111.2	45 30.8	110.1	46 07.9	108.9	2 50
40	45 25.8	115.6	46 05.8	114.5	46 45.2	113.4	47 23.9	112.3	48 02.0	111.1	40
30	47 14.2	118.1	47 55.0	117.0	48 35.4	115.9	49 15.1	114.7	49 54.4	113.5	30
20	49 00.0	120.6	49 42.1	119.5	50 23.6	118.4	51 04.4	117.2	51 44.5	116.0	20
10	50 43.0	123.4	51 26.2	122.3	52 08.9	121.2	52 51.0	119.9	53 32.5	118.7	10
2 00	52 22.6	126.2	53 07.3	125.1	53 51.3	124.0	54 34.6	122.8	55 17.3	121.6	2 00
1 50	53 58.6	129.3	54 44.5	128.2	55 30.1	127.1	56 14.9	125.9	56 58.8	124.7	1 50
40	55 30.0	132.7	56 17.6	131.6	57 04.6	130.5	57 50.8	129.3	58 36.5	128.1	40
30	56 56.6	136.3	57 45.7	135.2	58 34.4	134.1	59 22.4	132.9	60 09.7	131.7	30
20	58 17.5	140.2	59 08.4	139.1	59 58.7	138.1	60 48.3	136.9	61 37.4	135.7	20
10	59 32.0	144.3	60 24.3	143.3	61 16.4	142.3	62 07.9	141.2	62 58.8	140.0	10
1 00	60 39.0	148.7	61 33.2	147.8	62 26.9	146.8	63 20.1	145.8	64 13.0	144.7	1 00
50	61 38.0	153.4	62 33.5	152.5	63 28.8	151.6	64 23.9	150.7	65 18.7	149.8	0 50
40	62 27.6	158.3	63 24.7	157.6	64 21.5	156.9	65 18.2	156.1	66 14.6	155.3	40
30	63 07.2	163.5	64 05.1	162.9	65 03.8	162.3	66 01.8	161.7	66 59.7	161.1	30
20	63 36.4	168.9	64 35.6	168.5	65 34.7	168.1	66 33.9	167.7	67 33.0	167.2	20
10	63 54.1	174.4	64 53.9	174.2	65 53.6	174.0	66 53.4	173.8	67 53.2	173.6	10
0 00	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50					0 15.1	69.0	0 44.4	68.2	1 28.6	67.4	6 50
40	0 56.5	72.1	1 32.7	71.3	2 08.9	70.5	2 45.2	69.7	3 21.4	68.9	40
30	2 52.4	73.5	3 28.1	72.7	4 03.8	71.9	4 39.4	71.1	5 15.1	70.3	30
20	4 49.2	75.0	5 24.5	74.1	5 59.7	73.3	6 34.8	72.5	7 09.9	71.7	20
10	6 46.8	76.4	7 21.6	75.5	7 56.2	74.7	8 30.9	73.9	9 05.4	73.1	10
6 00	8 45.0	77.8	9 19.1	76.9	9 53.7	76.1	10 27.9	75.3	11 01.9	74.4	6 00
5 50	10 43.9	79.2	11 18.0	78.3	11 52.4	77.5	12 25.7	76.7	12 59.2	75.8	5 50
40	12 43.4	80.6	13 17.1	79.7	13 50.6	78.9	14 24.0	78.0	14 57.1	77.1	40
30	14 43.3	82.0	15 16.7	81.1	15 49.9	80.3	16 23.0	79.4	16 55.7	78.5	30
20	16 43.7	83.4	17 16.9	82.5	17 49.8	81.6	18 22.5	80.7	18 55.0	79.8	20
10	18 44.4	84.8	19 17.4	83.9	19 50.1	83.0	20 22.3	82.1	20 54.7	81.2	10
5 00	20 45.3	86.2	21 18.1	85.3	21 50.6	84.4	22 22.9	83.5	22 54.8	82.5	5 00
4 50	22 46.5	87.6	23 19.2	86.7	23 51.6	85.8	24 23.6	84.9	24 55.3	83.9	4 50
40	24 47.8	89.1	25 20.4	88.1	25 52.6	87.2	26 24.5	86.2	26 56.1	85.3	40
30	26 49.1	90.5	27 21.8	89.5	27 54.0	88.6	28 25.7	87.6	28 57.2	86.7	30
20	28 50.5	92.0	29 23.1	91.0	29 55.3	90.1	30 27.0	89.1	30 58.4	88.1	20
10	30 51.7	93.5	31 24.4	92.5	31 56.6	91.6	32 28.4	90.6	32 59.7	89.5	10
4 00	32 52.7	95.1	33 25.5	94.1	33 57.9	93.1	34 29.7	92.1	35 01.1	91.0	4 00
3 50	34 53.4	96.7	35 26.4	95.7	35 59.0	94.6	36 30.9	93.6	37 12.3	92.5	3 50
40	36 53.7	98.4	37 27.0	97.3	37 59.7	96.2	38 31.9	95.2	39 03.5	94.1	40
30	38 53.6	100.1	39 27.1	99.0	40 00.1	97.9	40 32.6	96.8	41 04.3	95.7	30
20	40 52.7	101.9	41 26.7	100.8	42 00.1	99.7	42 32.9	98.5	43 05.0	97.4	20
10	42 51.0	103.8	43 25.6	102.7	43 59.4	101.5	44 32.6	100.3	45 05.0	99.1	10
3 00	44 48.3	105.7	45 23.4	104.6	45 57.8	103.4	46 31.5	102.2	47 04.5	101.0	3 00
2 50	46 44.5	107.8	47 20.5	106.7	47 55.4	105.4	48 29.8	104.2	49 03.2	102.9	2 50
40	48 39.4	110.0	49 16.0	108.8	49 51.8	107.5	50 26.9	106.3	51 01.1	105.0	40
30	50 32.6	112.3	51 10.1	111.1	51 46.8	109.8	52 22.8	108.5	52 57.6	107.2	30
20	52 23.8	114.8	53 02.3	113.5	53 40.0	112.2	54 16.8	110.9	54 52.9	109.5	20
10	54 12.8	117.4	54 52.5	116.1	55 31.4	114.8	56 09.4	113.4	56 46.4	112.0	10
2 00	55 59.1	120.3	56 40.1	119.0	57 20.2	117.6	57 59.4	116.2	58 37.7	114.7	2 00
1 50	57 40.9	123.4	58 24.7	122.1	59 06.2	120.7	59 47.0	119.3	60 26.6	117.8	1 50
40	59 21.4	126.8	60 05.5	125.4	60 48.6	124.0	61 31.0	122.6	62 12.3	121.0	40
30	60 56.2	130.4	61 42.0	129.0	62 27.1	127.6	63 11.2	126.2	63 54.2	124.6	30
20	62 25.8	134.4	63 13.5	133.1	64 00.3	131.7	64 46.4	130.3	65 31.7	128.7	20
10	63 49.1	138.8	64 39.0	137.6	65 28.0	136.2	66 16.1	134.7	67 03.5	133.1	10
1 00	65 05.3	143.6	65 57.0	142.4	66 48.1	141.1	67 38.5	139.7	68 28.3	138.2	1 00
0 50	66 12.9	148.8	67 06.9	147.7	68 00.0	146.5	68 52.5	145.2	69 44.7	143.8	0 50
40	67 10.7	154.4	68 06.4	153.4	69 01.7	152.3	69 56.6	151.2	70 51.1	150.0	40
30	67 57.4	160.4	68 54.8	159.6	69 52.0	158.7	70 49.0	157.8	71 45.7	156.8	30
20	68 31.9	166.7	69 30.6	166.2	70 29.4	165.6	71 28.0	164.9	72 26.3	164.2	20
10	68 52.9	173.3	69 52.6	173.0	70 52.2	172.7	71 51.9	172.3	72 51.5	172.0	10
0 00	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10							0 19.6	61.4	0 57.8	60.6	7 10
7 00	0 14.7	65.2	0 52.1	64.4	1 29.6	63.6	2 07.0	62.8	2 44.4	62.1	7 00
6 50	2 05.4	66.6	2 42.2	65.8	3 18.8	65.0	3 55.5	64.3	4 32.2	63.5	6 50
40	3 57.5	68.1	4 33.6	67.3	5 09.6	66.5	5 45.6	65.7	6 21.5	64.9	40
30	5 50.6	69.5	6 26.1	68.7	7 01.4	67.8	7 36.6	67.0	8 11.9	66.2	30
20	7 44.8	70.9	8 19.6	70.0	8 54.4	69.2	9 29.1	68.4	10 03.6	67.6	20
10	9 39.8	72.3	10 14.2	71.4	10 48.2	70.5	11 22.2	69.7	11 56.2	68.9	10
6 00	11 35.8	73.6	12 09.6	72.8	12 43.2	71.9	13 16.6	71.1	13 49.9	70.2	6 00
5 50	13 32.6	74.9	14 05.8	74.1	14 38.9	73.2	15 11.8	72.4	15 44.5	71.5	5 50
40	15 30.1	76.3	16 02.9	75.4	16 35.5	74.5	17 07.9	73.7	17 40.0	72.8	40
30	17 28.3	77.6	18 00.7	76.7	18 32.8	75.8	19 04.6	74.9	19 36.2	74.0	30
20	19 27.2	78.9	19 59.2	78.0	20 30.9	77.1	21 02.3	76.2	21 33.4	75.3	20
10	21 26.5	80.3	21 58.2	79.3	22 29.5	78.4	23 00.4	77.5	23 31.0	76.6	10
5 00	23 26.4	81.6	23 57.7	80.7	24 28.6	79.8	24 59.2	78.8	25 29.4	77.9	5 00
4 50	25 26.6	83.0	25 57.6	82.0	26 28.3	81.1	26 58.4	80.1	27 28.3	79.2	4 50
40	27 27.2	84.3	27 57.9	83.4	28 28.3	82.4	28 58.2	81.4	29 27.6	80.4	40
30	29 28.1	85.7	29 58.7	84.7	30 28.9	83.7	30 58.3	82.7	31 27.5	81.7	30
20	31 29.2	87.1	31 59.6	86.1	32 29.6	85.1	32 59.0	84.0	33 27.9	83.0	20
10	33 30.5	88.5	34 00.7	87.5	34 30.6	86.4	34 59.7	85.4	35 28.4	84.3	10
4 00	35 31.9	90.0	36 02.1	88.9	36 31.8	87.8	37 00.9	86.7	37 29.3	85.6	4 00
3 50	37 35.2	91.5	38 03.5	90.4	38 33.1	89.2	39 02.0	88.1	39 30.4	87.0	3 50
40	39 34.4	93.0	40 04.7	91.9	40 34.4	90.7	41 03.5	89.6	41 31.7	88.4	40
30	41 35.5	94.6	42 06.0	93.4	42 35.7	92.2	43 04.7	91.1	43 33.1	89.8	30
20	43 36.3	96.2	44 06.9	95.0	44 36.9	93.8	45 06.1	92.6	45 34.3	91.3	20
10	45 36.8	97.9	46 07.7	96.7	46 37.9	95.5	47 07.2	94.2	47 35.6	92.9	10
3 00	47 36.6	99.7	48 07.9	98.5	48 38.4	97.2	49 08.1	95.8	49 36.7	94.5	3 00
2 50	49 36.0	101.6	50 07.7	100.3	50 38.6	99.0	51 08.6	97.6	51 37.5	96.2	2 50
40	51 34.4	103.6	52 06.7	102.3	52 38.2	100.9	53 08.8	99.4	53 38.0	98.0	40
30	53 31.7	105.8	54 04.8	104.4	54 36.9	103.0	55 07.9	101.4	55 37.9	99.9	30
20	55 27.8	108.1	56 01.7	106.6	56 34.7	105.1	57 06.6	103.5	57 37.0	102.0	20
10	57 22.4	110.5	57 57.4	109.0	58 31.2	107.4	59 03.9	105.8	59 35.2	104.2	10
2 00	59 14.9	113.2	59 51.0	111.6	60 26.1	110.0	61 00.1	108.3	61 32.3	106.6	2 00
1 50	61 05.2	116.2	61 42.9	114.6	62 19.1	112.9	62 54.0	111.1	63 27.6	109.2	1 50
40	62 52.5	119.4	63 31.5	117.7	64 09.5	116.0	64 46.2	114.1	65 21.2	112.2	40
30	64 36.5	123.0	65 17.2	121.3	65 57.0	119.5	66 35.4	117.5	67 12.7	115.5	30
20	66 15.7	127.0	66 58.6	125.2	67 40.4	123.4	68 21.1	121.4	68 59.9	119.3	20
10	67 49.9	131.5	68 35.1	129.7	69 19.2	127.9	70 01.9	125.8	70 43.5	123.6	10
1 00	69 17.0	136.6	70 04.8	134.8	70 51.7	132.9	71 37.4	130.9	72 21.4	128.7	1 00
0 50	70 36.2	142.2	71 26.7	140.6	72 16.5	138.8	73 04.7	136.8	73 52.0	134.6	0 50
40	71 44.9	148.6	72 38.1	147.1	73 30.9	145.4	74 22.9	143.6	75 13.4	141.5	40
30	72 41.7	155.6	73 37.7	154.4	74 33.2	153.0	75 27.7	151.3	76 22.0	149 6	30
20	73 24.5	163.3	74 22.5	162.4	75 20.3	161.4	76 17.8	160.2	77 14.8	158.8	20
10	73 51.0	171.5	74 50.5	171.0	75 49.9	170.5	76 49.2	169.9	77 48.5	169.1	10
0 00	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	78 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	2 01.4	91.4	1 26.0	92.3	0 50.8	93.1	0 15.4	93.9			5 50
40	4 02.6	92.9	3 27.2	93.7	2 51.8	94.6	2 16.4	95.4	1 40.9	96.2	40
30	6 03.7	94.4	5 28.2	95.2	4 52.6	96.0	4 17.0	96.8	3 41.3	97.6	30
20	8 04.6	95.9	7 28.9	96.7	6 53.2	97.5	6 17.3	98.3	5 41.4	99.1	20
10	10 05.1	97.4	9 29.2	98.2	8 53.2	99.0	8 17.1	99.8	7 40.9	100.6	10
5 00	12 05.2	99.0	11 29.1	99.8	10 52.8	100.6	10 16.4	101.4	9 39.9	102.2	5 00
4 50	14 04.8	100.5	13 28.4	101.3	12 51.8	102.1	12 15.0	102.9	11 38.1	103.7	4 50
40	16 03.9	102.1	15 27.1	102.9	14 50.1	103.7	14 12.9	104.5	13 35.6	105.3	40
30	18 02.1	103.7	17 24.9	104.5	16 47.4	105.3	16 09.9	106.1	15 32.2	106.9	30
20	19 59.6	105.3	19 22.0	106.2	18 44.1	107.0	18 06.0	107.8	17 27.7	108.6	20
10	21 56.2	107.0	21 17.9	107.9	20 39.6	108.7	20 00.9	109.5	19 22.2	110.3	10
4 00	23 51.6	108.8	23 12.9	109.6	22 34.0	110.4	21 54.7	111.2	21 15.3	112.0	4 00
3 50	25 45.9	110.6	25 06.6	111.4	25 27.0	112.2	24 47.2	113.0	24 07.1	113.8	3 50
40	27 38.9	112.4	26 58.9	113.2	26 18.7	114.0	25 38.1	114.9	24 57.3	115.7	40
30	29 30.3	114.3	28 49.7	115.1	28 08.6	115.9	27 27.3	116.8	26 45.7	117.6	30
20	31 20.1	116.3	30 38.6	117.1	29 56.8	117.9	29 14.7	118.8	28 32.3	119.6	20
10	33 07.9	118.4	32 25.7	119.2	31 43.1	120.0	31 00.1	120.8	30 16.8	121.6	10
3 00	34 53.6	120.5	34 10.5	121.3	33 27.0	122.1	32 43.1	122.9	31 59.0	123.7	3 00
2 50	36 37.0	122.7	35 52.9	123.5	35 08.5	124.3	34 23.7	125.2	33 38.5	126.0	2 50
40	38 17.8	125.0	37 32.7	125.8	36 47.3	126.7	36 01.5	127.5	35 15.4	128.3	40
30	39 55.7	127.5	39 09.6	128.3	38 23.1	129.1	37 36.2	129.9	36 49.0	130.7	30
20	41 30.4	130.0	40 43.2	130.8	39 55.6	131.6	39 07.6	132.4	38 19.4	133.2	20
10	43 01.4	132.7	42 13.1	133.5	41 24.4	134.3	40 35.3	135.1	39 46.0	135.8	10
2 00	44 28.6	135.5	43 39.0	136.3	42 49.1	137.1	41 59.0	137.8	41 08.5	138.5	2 00
1 50	45 51.3	138.5	45 00.6	139.2	44 09.6	140.0	43 18.2	140.7	42 26.6	141.4	1 50
40	47 09.4	141.6	46 17.4	142.3	45 25.1	143.0	44 32.5	143.7	43 09.8	144.3	40
30	48 22.0	144.9	47 28.9	145.5	46 35.4	146.2	45 41.8	146.8	44 37.8	147.5	30
20	49 29.1	148.2	48 34.7	148.9	47 40.1	149.5	46 45.3	150.1	45 50.3	150.7	20
10	50 29.6	151.8	49 34.2	152.4	48 38.5	153.0	47 42.5	153.5	46 46.7	154.0	10
1 00	51 23.6	155.5	50 27.0	156.0	49 30.3	156.5	48 33.5	157.0	47 36.5	157.5	1 00
0 50	52 10.2	159.3	51 12.7	159.8	50 15.1	160.2	49 17.2	160.7	48 19.5	161.1	0 50
40	52 49.1	163.3	51 50.8	163.7	50 52.3	164.0	49 53.8	164.4	48 55.2	164.7	40
30	53 19.8	167.4	52 20.8	167.7	51 21.7	167.9	50 22.4	168.2	49 23.3	168.5	30
20	53 42.1	171.5	52 42.5	171.7	51 42.9	171.9	50 43.3	172.1	49 43.7	172.3	20
10	53 55.5	175.8	52 55.6	175.9	51 55.8	175.9	50 55.8	176.0	49 55.8	176.1	10
0 00	54 0.0	180.0	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	1 05.4	97.0	0 29.9	97.8							5 40
30	3 05.5	98.5	2 29.8	99.3	1 54.1	100.1	1 18.2	100.9	0 42.4	101.7	30
20	5 05.4	100.0	4 29.4	100.8	3 53.3	101.6	3 17.1	102.4	2 41.0	103.2	20
10	7 04.6	101.5	6 28.2	102.3	5 51.9	103.1	5 15.3	103.9	4 38.8	104.7	10
5 00	9 03.0	103.0	8 26.5	103.8	7 49.6	104.6	7 12.7	105.4	6 35.7	106.2	5 00
4 50	11 01.0	104.5	10 23.9	105.3	9 46.7	106.1	9 09.3	106.9	8 31.8	107.7	4 50
40	12 58.1	106.1	12 20.5	106.9	11 42.8	107.7	11 04.9	108.5	10 26.9	109.3	40
30	14 54.2	107.7	14 16.1	108.5	13 37.9	109.3	12 59.4	110.1	12 20.8	110.9	30
20	16 49.2	109.4	16 10.6	110.2	15 31.7	111.0	14 52.7	111.8	14 13.6	112.6	20
10	18 43.1	111.1	18 03.8	111.9	17 24.4	112.7	16 44.7	113.5	16 04.9	114.3	10
4 00	20 35.6	112.8	19 55.7	113.6	19 15.5	114.4	18 35.2	115.2	17 54.7	116.0	4 00
3 50	23 26.8	114.6	22 46.1	115.4	21 05.4	116.2	20 24.3	117.0	19 43.1	117.8	3 50
40	24 16.2	116.5	23 34.9	117.3	22 53.3	118.1	22 11.5	118.8	21 29.5	119.6	40
30	26 03.8	118.4	25 21.8	119.2	24 39.5	120.0	23 56.8	120.7	23 14.0	121.5	30
20	27 49.7	120.4	27 06.7	121.1	26 23.5	121.9	25 40.1	122.7	24 56.4	123.4	20
10	29 33.3	122.4	28 49.5	123.2	28 05.4	124.0	27 21.1	124.7	26 36.5	125.4	10
3 00	31 14.5	124.5	30 29.7	125.3	29 44.7	126.1	28 59.4	126.8	28 13.9	127.5	3 00
2 50	32 53.1	126.7	32 07.5	127.5	31 21.5	128.3	30 35.3	129.0	29 48.7	129.7	2 50
40	34 29.0	129.0	33 42.3	129.8	32 55.3	130.6	32 08.0	131.3	31 20.6	132.0	40
30	36 01.6	131.4	35 13.9	132.2	34 25.9	132.9	33 37.6	133.6	32 49.1	134.3	30
20	37 30.9	133.9	36 42.0	134.6	35 52.9	135.4	35 03.6	136.1	34 14.1	136.7	20
10	38 56.2	136.5	38 06.4	137.2	37 16.3	137.9	36 26.0	138.6	35 35.3	139.2	10
2 00	40 17.8	139.2	39 26.7	139.9	38 35.5	140.6	37 44.0	141.3	36 52.4	141.9	2 00
1 50	41 34.7	142.1	40 42.6	142.7	39 50.3	143.3	38 57.8	144.0	38 05.1	144.6	1 50
40	42 46.8	145.0	41 53.6	145.6	41 00.2	146.2	40 06.6	146.8	39 12.9	147.4	40
30	43 53.8	148.1	42 59.4	148.6	42 05.0	149.2	41 10.5	149.8	40 15.6	150.3	30
20	44 55.1	151.2	43 59.8	151.8	43 04.3	152.3	42 08.7	152.8	41 13.0	153.3	20
10	45 50.4	154.5	44 54.2	155.0	43 57.7	155.5	43 01.2	156.0	42 04.5	156.4	10
1 00	46 39.4	157.9	45 42.1	158.4	44 44.8	158.8	43 47.4	159.2	42 50.0	159.6	1 00
0 50	47 21.5	161.4	46 23.4	161.8	45 25.4	162.2	44 27.4	162.5	43 29.1	162.9	0 50
40	47 56.5	165.0	46 57.8	165.3	45 59.0	165.6	45 00.2	165.9	44 01.4	166.2	40
30	48 24.0	168.7	47 24.8	168.9	46 25.6	169.2	45 26.3	169.4	44 27.0	169.6	30
20	48 44.0	172.4	47 44.4	172.6	46 44.6	172.7	45 44.9	172.9	44 45.2	173.1	20
10	48 56.0	176.2	47 56.1	176.3	46 56.2	176.3	45 56.2	176.4	44 56.2	176.5	10
0 00	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 06.6	102.5									5 30
20	2 04.8	104.0	1 28.5	104.7	0 52.3	105.5	0 16.1	106.3			20
10	4 02.1	105.5	3 25.5	106.2	2 48.8	107.0	2 12.0	107.8	1 35.2	108.6	10
5 00	5 58.7	107.0	5 21.5	107.8	4 44.3	108.6	4 07.1	109.3	3 29.7	110.1	5 00
4 50	7 54.3	108.5	7 16.5	109.3	6 38.9	110.1	6 01.0	110.8	5 23.1	111.6	4 50
40	9 48.8	110.1	9 10.5	110.9	8 32.2	111.7	7 53.8	112.4	7 15.3	113.2	40
30	11 42.4	111.7	11 03.3	112.5	10 24.4	113.3	9 45.3	114.0	9 06.1	114.8	30
20	13 34.2	113.4	12 54.8	114.1	12 15.2	114.9	11 35.5	115.6	10 55.6	116.4	20
10	15 24.9	115.1	14 44.8	115.8	14 04.5	116.6	13 24.1	117.3	12 43.4	118.1	10
4 00	17 14.1	116.8	16 33.2	117.5	15 52.2	118.3	15 11.0	119.0	14 29.7	119.8	4 00
3 50	19 01.6	118.6	18 20.0	119.3	17 38.3	120.1	16 56.3	120.8	16 14.1	121.5	3 50
40	20 47.3	120.4	20 04.8	121.1	19 22.2	121.9	18 39.4	122.6	17 56.5	123.3	40
30	22 30.9	122.3	21 47.8	123.0	21 04.4	123.8	20 20.6	124.5	19 36.8	125.2	30
20	24 12.5	124.2	23 28.4	124.9	22 44.1	125.7	21 59.6	126.4	21 14.8	127.1	20
10	25 51.7	126.2	25 06.6	126.9	24 21.6	127.7	23 35.9	128.4	22 50.3	129.1	10
3 00	27 28.2	128.3	26 42.3	129.0	25 56.1	129.7	25 09.7	130.4	24 23.1	131.1	3 00
2 50	29 02.1	130.5	28 15.2	131.2	27 28.0	131.9	26 40.7	132.6	25 53.0	133.2	2 50
40	30 32.9	132.7	29 44.9	133.4	28 56.8	134.1	28 08.4	134.8	27 19.9	135.4	40
30	32 00.4	135.0	31 11.4	135.7	30 22.2	136.4	29 32.9	137.1	28 43.4	137.7	30
20	33 24.3	137.4	32 34.4	138.1	31 44.2	138.7	30 53.8	139.4	30 03.3	140.0	20
10	34 44.5	139.9	33 53.5	140.6	33 02.3	141.2	32 10.9	141.8	31 19.4	142.4	10
2 00	36 00.5	142.5	35 08.5	143.1	34 16.3	143.7	33 23.9	144.3	32 31.3	144.9	2 00
1 50	37 12.2	145.2	36 19.1	145.8	35 25.9	146.3	34 32.5	146.9	33 38.8	147.5	1 50
40	38 18.9	148.0	37 24.9	148.6	36 30.7	149.1	35 36.3	149.6	34 41.8	150.1	40
30	39 20.7	150.8	38 25.7	151.4	37 30.6	151.9	36 35.3	152.4	35 39.8	152.8	30
20	40 17.2	153.8	39 21.2	154.3	38 25.2	154.7	37 29.0	155.2	36 32.7	155.6	20
10	41 07.7	156.9	40 11.0	157.3	39 14.2	157.7	38 17.1	158.1	37 19.9	158.5	10
1 00	41 52.5	160.0	40 54.9	160.4	39 57.3	160.7	38 59.5	161.1	38 01.7	161.4	1 00
0 50	42 30.9	163.2	41 32.5	163.5	40 34.2	163.8	39 35.9	164.1	38 37.3	164.4	0 50
40	43 02.5	166.5	42 03.6	166.7	41 04.7	167.0	40 05.8	167.2	39 06.8	167.5	40
30	43 27.5	169.8	42 28.2	170.0	41 28.9	170.2	40 29.6	170.4	39 29.9	170.6	30
20	43 45.5	173.2	42 45.8	173.3	41 46.1	173.5	40 46.4	173.6	39 46.7	173.7	20
10	43 56.4	176.5	42 56.5	176.6	41 56.5	176.7	40 56.6	176.8	39 56.7	176.8	10
0 00	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 58.5	109.4	0 21.7	110.2							5 10
5 00	2 52.4	110.9	2 15.0	111.7	1 37.6	112.5	1 00.2	113.3	0 22.8	114.0	5 00
4 50	4 45.1	112.4	4 07.1	113.2	3 29.1	114.0	2 51.0	114.8	2 12.9	115.5	4 50
40	6 36.7	114.0	5 58.0	114.8	5 19.3	115.5	4 40.5	116.3	4 01.7	117.0	40
30	8 26.9	115.6	7 47.5	116.3	7 08.1	117.1	6 28.7	117.8	5 49.1	118.6	30
20	10 15.7	117.2	9 35.6	117.9	8 55.4	118.7	8 15.1	119.4	7 34.7	120.2	20
10	12 02.8	118.8	11 22.0	119.6	10 41.0	120.3	10 00.0	121.0	9 18.8	121.8	10
4 00	13 48.2	120.5	13 06.6	121.3	12 24.9	122.0	11 43.0	122.7	11 01.0	123.5	4 00
3 50	15 31.8	122.3	14 49.3	123.0	14 06.8	123.7	13 24.1	124.4	12 41.2	125.2	3 50
40	17 13.4	124.1	16 30.1	124.8	15 46.7	125.5	15 03.1	126.2	14 19.3	126.9	40
30	18 52.8	125.9	18 08.7	126.6	17 24.2	127.3	16 39.8	128.0	15 55.2	128.7	30
20	20 29.9	127.8	19 44.8	128.5	18 59.6	129.2	18 14.2	129.9	17 28.6	130.6	20
10	22 04.5	129.8	21 18.5	130.5	20 32.4	131.2	19 45.9	131.8	18 59.4	132.5	10
3 00	23 36.3	131.8	22 49.4	132.5	22 02.3	133.2	21 15.0	133.8	20 27.5	134.5	3 00
2 50	25 05.3	133.9	24 17.4	134.6	23 29.2	135.3	22 40.9	135.9	21 52.6	136.5	2 50
40	26 31.1	136.1	25 42.2	136.7	24 53.1	137.4	24 03.9	138.0	23 14.5	138.6	40
30	27 53.7	138.3	27 03.8	138.9	26 13.7	139.6	25 23.4	140.2	24 33.1	140.8	30
20	29 12.5	140.6	28 21.6	141.2	27 30.6	141.8	26 39.4	142.4	25 48.0	143.0	20
10	30 27.6	143.0	29 35.7	143.6	28 43.7	144.1	27 51.5	144.7	26 59.2	145.3	10
2 00	31 38.6	145.4	30 45.7	146.0	29 52.7	146.5	28 59.6	147.1	28 06.3	147.6	2 00
1 50	32 44.3	148.0	31 51.3	148.5	30 57.4	149.0	30 03.4	149.5	29 09.2	150.0	1 50
40	33 47.2	150.6	32 52.5	151.1	31 57.6	151.6	31 02.6	152.0	30 07.6	152.5	40
30	34 44.2	153.3	33 48.6	153.8	32 52.9	154.2	31 57.1	154.6	31 01.2	155.0	30
20	35 36.3	156.0	34 39.8	156.5	33 43.2	156.9	32 46.6	157.3	31 49.9	157.6	20
10	36 22.8	158.9	35 25.6	159.3	34 28.4	159.6	33 30.9	159.9	32 33.6	160.3	10
1 00	37 03.8	161.8	36 05.8	162.1	35 07.8	162.4	34 09.8	162.7	33 11.7	163.0	1 00
0 50	37 38.8	164.7	36 40.3	165.0	35 41.8	165.3	34 43.1	165.5	33 44.5	165.7	0 50
40	38 07.8	167.7	37 08.8	167.9	36 09.7	168.2	35 10.6	168.4	34 11.4	168.6	40
30	38 30.6	170.7	37 31.0	170.9	36 31.6	171.1	35 32.1	171.2	34 32.7	171.4	30
20	38 46.9	173.8	37 47.1	173.9	36 47.3	174.0	35 47.6	174.1	34 47.8	174.2	20
10	38 56.8	176.9	37 56.8	177.0	36 56.8	177.0	35 56.8	177.1	34 57.0	177.1	10
0 00	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	1 34.7	116.3	0 56.6	117.1	0 18.5	117.9					4 50
40	3 22.8	117.8	2 43.9	118.6	2 05.0	119.3	1 26.1	120.1	0 47.1	120.8	40
30	5 09.3	119.3	4 29.8	120.1	3 50.1	120.8	3 10.2	121.6	2 30.4	122.3	30
20	6 54.3	120.9	6 13.8	121.7	5 33.3	122.4	4 52.7	123.1	4 12.1	123.8	20
10	8 37.7	122.5	7 56.2	123.3	7 14.8	124.0	6 33.4	124.7	5 51.8	125.4	10
4 00	10 18.9	124.2	9 36.7	124.9	8 54.5	125.6	8 12.1	126.3	7 29.7	127.0	4 00
3 50	11 58.4	125.9	11 15.3	126.6	10 32.1	127.3	9 48.8	128.0	9 05.6	128.7	3 50
40	13 35.5	127.6	12 51.6	128.3	12 07.5	129.0	11 23.3	129.7	10 39.1	130.4	40
30	15 10.5	129.4	14 25.6	130.1	13 40.6	130.8	12 55.5	131.5	12 10.3	132.1	30
20	16 42.9	131.3	15 57.1	132.0	15 11.2	132.6	14 25.2	133.3	13 39.0	133.9	20
10	18 12.9	133.2	17 26.1	133.9	16 39.2	134.5	15 52.2	135.1	15 05.1	135.8	10
3 00	19 39.9	135.1	18 52.2	135.8	18 04.4	136.4	17 16.4	137.0	16 28.3	137.7	3 00
2 50	21 04.1	137.1	20 15.3	137.8	19 26.5	138.4	18 37.6	139.0	17 48.4	139.6	2 50
40	22 25.0	139.2	21 35.3	139.8	20 45.5	140.4	19 55.6	141.0	19 05.5	141.6	40
30	23 42.6	141.3	22 51.9	141.9	22 01.1	142.5	21 10.2	143.1	20 19.2	143.6	30
20	24 56.5	143.5	24 04.9	144.1	23 13.2	144.7	22 21.4	145.2	21 29.4	145.7	20
10	26 06.8	145.8	25 14.2	146.3	24 21.5	146.9	23 28.7	147.4	22 35.8	147.9	10
2 00	27 12.9	148.1	26 19.4	148.6	25 25.9	149.1	24 32.2	149.6	23 38.4	150.1	2 00
1 50	28 14.9	150.5	27 20.5	151.0	26 26.0	151.4	25 31.5	151.9	24 36.7	152.4	1 50
40	29 12.4	152.9	28 17.2	153.4	27 21.8	153.8	26 26.4	154.3	25 30.9	154.7	40
30	30 05.3	155.4	29 09.2	155.9	28 13.2	156.3	27 16.8	156.7	26 20.6	157.0	30
20	30 53.1	158.0	29 56.3	158.4	28 59.4	158.8	28 02.5	159.1	27 05.5	159.5	20
10	31 36.2	160.6	30 38.6	161.0	29 41.0	161.3	28 43.3	161.6	27 45.7	161.9	10
1 00	32 13.6	163.3	31 15.5	163.6	30 17.3	163.9	29 19.1	164.1	28 20.8	164.4	1 00
0 50	32 45.8	166.0	31 47.1	166.3	30 48.4	166.5	29 49.6	166.7	28 50.8	166.9	0 50
40	33 12.2	168.8	32 13.1	169.0	31 13.9	169.2	30 14.8	169.3	29 15.6	169.5	40
30	33 33.1	171.5	32 33.6	171.7	31 34.0	171.8	30 34.5	172.0	29 35.0	172.1	30
20	33 48.0	174.4	32 48.2	174.5	31 48.4	174.6	30 48.6	174.7	29 48.8	174.8	20
10	33 57.1	177.2	32 57.1	177.2	31 57.1	177.3	30 57.2	177.3	29 57.2	177.4	10
0 00	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 24.9	85.3	6 10
6 00	0 00.0	90.0	0 36.1	89.2	1 12.3	88.4	1 48.3	87.6	2 24.4	86.8	6 00
5 50	1 59.8	91.5	2 35.9	90.7	3 12.0	89.9	3 48.1	89.1	4 24.1	88.3	5 50
40	3 59.5	93.0	4 35.7	92.2	5 11.9	91.4	5 47.9	90.6	6 23.9	89.8	40
30	5 59.0	94.5	6 35.3	93.7	7 11.5	92.9	7 47.6	92.1	8 23.6	91.3	30
20	7 58.3	96.1	8 34.7	95.3	9 11.0	94.5	9 47.2	93.7	10 23.3	92.8	20
10	9 57.2	97.6	10 33.9	96.8	11 10.2	96.0	11 46.8	95.2	12 22.9	94.3	10
5 00	11 55.8	99.2	12 32.6	98.4	13 09.3	97.5	13 45.9	96.7	14 22.2	95.9	5 00
4 50	13 53.8	100.8	14 30.9	100.0	15 07.8	99.1	15 44.6	98.3	16 21.2	97.5	4 50
40	15 51.1	102.4	16 28.6	101.6	17 05.9	100.7	17 42.9	99.9	18 19.7	99.1	40
30	17 47.8	104.0	18 25.6	103.2	19 03.1	102.3	19 40.6	101.5	20 17.8	100.7	30
20	19 43.6	105.7	20 21.8	104.9	20 59.8	104.0	21 37.7	103.2	22 15.2	102.4	20
10	21 38.4	107.4	22 17.1	106.6	22 55.6	105.7	23 33.8	104.9	24 11.8	104.1	10
4 00	23 32.1	109.2	24 11.4	108.4	24 50.4	107.5	25 29.1	106.7	26 07.5	105.8	4 00
3 50	25 24.6	111.0	26 04.5	110.2	26 44.1	109.3	27 23.3	108.5	28 02.2	107.6	3 50
40	27 15.8	112.9	27 56.2	112.1	28 36.4	111.2	29 16.3	110.4	29 55.8	109.5	40
30	29 05.4	114.8	29 46.6	114.0	30 27.4	113.1	31 07.9	112.3	31 48.1	111.4	30
20	30 53.2	116.8	31 35.2	116.0	32 16.8	115.1	32 58.0	114.3	33 38.9	113.4	20
10	32 39.2	118.9	33 21.9	118.1	34 04.2	117.2	34 46.3	116.4	35 28.0	115.5	10
3 00	34 23.0	121.1	35 06.6	120.3	35 49.8	119.4	36 32.7	118.5	37 15.2	117.6	3 00
2 50	36 04.4	123.3	36 48.9	122.5	37 33.0	121.6	38 16.8	120.8	39 00.2	119.9	2 50
40	37 43.1	125.7	38 28.6	124.9	39 13.7	124.0	39 58.5	123.1	40 42.8	122.2	40
30	39 19.0	128.1	40 05.4	127.3	40 51.6	126.5	41 37.4	125.6	42 22.7	124.7	30
20	40 51.6	130.7	41 39.1	129.9	42 26.4	129.1	43 13.3	128.2	43 59.7	127.3	20
10	42 20.5	133.4	43 09.2	132.6	43 57.6	131.8	44 45.6	130.9	45 33.2	130.1	10
2 00	43 45.6	136.2	44 35.5	135.4	45 25.0	134.6	46 14.1	133.8	47 03.0	132.9	2 00
1 50	45 06.2	139.1	45 57.3	138.4	46 48.1	137.6	47 38.5	136.8	48 28.5	135.9	1 50
40	46 22.2	142.2	47 14.3	141.5	48 06.3	140.8	48 57.9	140.0	49 49.2	139.2	40
30	47 32.8	145.5	48 26.2	144.8	49 19.4	144.1	50 12.3	143.3	51 04.8	142.6	30
20	48 37.9	148.8	49 32.4	148.2	50 26.7	147.5	51 20.8	146.8	52 14.6	146.1	20
10	49 36.6	152.4	50 32.4	151.8	51 27.9	151.2	52 23.0	150.5	53 18.1	149.9	10
1 00	50 28.9	156.0	51 25.5	155.5	52 22.1	154.9	53 18.5	154.4	54 14.7	153.8	1 00
0 50	51 14.0	159.8	52 11.6	159.4	53 09.2	158.9	54 06.6	158.4	55 03.9	157.9	0 50
40	51 51.6	163.7	52 50.1	163.3	53 48.5	162.9	54 46.7	162.5	55 44.9	162.1	40
30	52 21.3	167.7	53 20.5	167.4	54 19.5	167.1	55 18.5	166.7	56 17.4	166.4	30
20	52 42.7	171.7	53 42.3	171.5	54 41.9	171.3	55 41.5	171.1	56 41.0	170.9	20
10	52 55.7	175.8	53 55.6	175.7	54 55.4	175.6	55 55.3	175.5	56 55.2	175.4	10
0 00	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 14.6	81.4	0 51.0	80.6	1 27.3	79.8	6 20
10	1 01.0	84.5	1 37.2	83.7	2 13.3	82.9	2 49.5	82.1	3 25.5	81.3	10
6 00	3 00.4	86.0	3 36.4	85.2	4 12.3	84.4	4 48.2	83.6	5 24.1	82.8	6 00
5 50	5 00.0	87.5	5 35.8	86.7	6 11.7	85.9	6 47.4	85.1	7 23.1	84.3	5 50
40	6 59.8	89.0	7 35.6	88.2	8 11.3	87.4	8. 46.9	86.6	9 22.5	85.8	40
30	8 59.5	90.5	9 35.3	89.7	10 11.0	88.9	10 46.6	88.1	11 22.0	87.3	30
20	10 59.3	92.0	11 35.1	91.2	12 10.8	90.4	12 46.3	89.6	13 21.8	88.8	20
10	12 58.9	93.5	13 34.9	92.7	14 10.6	91.9	14 46.2	91.1	15 21.5	90.3	10
5 00	14 58.4	95.1	15 34.5	94.3	16 10.3	93.5	16 45.9	92.6	17 21.4	91.8	5 00
4 50	16 57.5	96.7	17 33.8	95.8	18 09.7	95.0	18 45.5	94.1	19 21.0	93.3	4 50
40	18 56.4	98.3	19 32.8	97.4	20 08.9	96.6	20 44.9	95.7	21 20.5	94.9	40
30	20 54.7	99.9	21 31.2	99.0	22 07.7	98.2	22 43.9	97.3	23 19.6	96.4	30
20	22 52.4	101.6	23 29.4	100.7	24 06.1	99.9	24 42.5	98.9	25 18.6	98.1	20
10	24 49.3	103.3	25 26.7	102.3	26 03.8	101.5	26 40.6	100.6	27 16.8	99.7	10
4 00	26 45.6	105.0	27 23.4	104.1	28 00.8	103.2	28 37.9	102.3	29 14.6	101.4	4 00
3 50	28 40.8	106.8	29 19.1	105.9	29 57.1	105.0	30 34.5	104.1	31 12.0	103.2	3 50
40	30 34.9	108.6	31 13.8	107.7	31 52.2	106.8	32 30.3	105.9	33 08.0	105.0	40
30	32 27.9	110.5	33 07.3	109.6	33 46.3	108.7	34 25.0	107.8	35 03.1	106.9	30
20	34 19.3	112.5	34 59.5	111.6	35 39.2	110.7	36 18.4	109.7	37 57.2	108.8	20
10	36 09.2	114.6	36 50.1	113.7	37 30.5	112.7	38 10.5	111.8	38 49.9	110.8	10
3 00	37 57.2	116.7	38 38.8	115.8	39 20.1	114.8	40 00.8	113.9	40 41.1	112.9	3 00
2 50	39 43.1	119.0	40 25.8	118.1	41 07.1	117.1	41 49.5	116.2	42 30.5	115.2	2 50
40	41 26.7	121.3	42 10.2	120.4	42 53.3	119.5	43 35.8	118.5	44 17.8	117.5	40
30	43 07.6	123.8	43 52.2	122.9	44 36.2	122.0	45 19.9	121.0	46 03.0	120.0	30
20	44 45.7	126.4	45 31.4	125.5	46 16.5	124.6	47 01.2	123.6	47 45.4	122.6	20
10	46 20.4	129.2	47 07.1	128.3	47 53.5	127.3	48 39.4	126.4	49 24.7	125.4	10
2 00	47 51.4	132.1	48 39.4	131.2	49 27.0	130.2	50 14.0	129.3	51 00.7	128.3	2 00
1 50	49 18.1	135.1	50 07.4	134.3	50 56.2	133.4	51 44.7	132.4	52 32.7	131.4	1 50
40	50 40.1	138.4	51 30.8	137.5	52 21.0	136.6	53 10.8	135.7	54 00.1	134.7	40
30	51 57.0	141.8	52 49.0	141.0	53 40.6	140.1	54 31.8	139.2	55 22.6	138.2	30
20	53 08.1	145.4	54 01.4	144.6	54 54.4	143.8	55 47.0	143.0	56 39.2	142.1	20
10	54 12.9	149.2	55 07.5	148.5	56 01.9	147.7	56 55.9	146.9	57 49.6	146.1	10
1 00	55 10.7	153.2	56 06.5	152.5	57 02.2	151.8	57 57.5	151.1	58 52.6	150.4	1 00
0 50	56 00.9	157.3	56 57.9	156.7	57 54.6	156.1	58 51.4	155.5	59 47.7	154.9	0 50
40	56 43.0	161.6	57 41.0	161.1	58 38.9	160.6	59 36.5	160.1	60 34.2	159.6	40
30	57 16.1	166.1	58 15.0	165.7	59 13.9	165.3	60 12.7	164.9	61 11.3	164.5	30
20	57 40.5	170.7	58 47.2	170.4	59 46.8	170.2	60 46.4	169.9	61 46.0	169.6	20
10	57 55.1	175.3	58 55.0	175.2	59 54.8	175.1	60 54.7	174.9	61 54.5	174.8	10
0 00	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

36° 57.2

58° 39.9 59° 39.4 60° 38.8 61° 38.2

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 00.9	73.7	0 37.9	72.9	6 40
30	0 06.3	77.6	0 43.0	76.8	1 19.6	76.0	1 56.2	75.2	2 32.8	74.3	30
20	2 03.6	79.0	2 39.9	78.2	3 16.2	77.4	3 52.4	76.6	4 28.6	75.8	20
10	4 01.5	80.5	4 37.5	79.7	5 13.4	78.9	5 49.3	78.1	6 25.1	77.3	10
6 00	5 59.9	82.0	6 35.6	81.2	7 11.3	80.4	7 46.8	79.6	8 22.3	78.7	6 00
5 50	7 58.8	83.5	8 34.2	82.7	9 09.6	81.8	9 44.9	81.0	10 20.1	80.1	5 50
40	9 57.9	84.9	10 33.3	84.1	11 08.4	83.3	11 43.5	82.5	12 18.3	81.6	40
30	11 57.4	86.4	12 32.5	85.6	13 07.6	84.7	13 42.4	83.9	14 17.1	83.0	30
20	13 57.0	87.9	14 32.1	87.1	15 07.0	86.2	15 41.7	85.4	16 16.2	84.5	20
10	15 56.8	89.4	16 31.8	88.6	17 06.6	87.7	17 41.1	86.8	18 15.6	85.9	10
5 00	17 56.6	90.9	18 31.6	90.1	19 06.4	89.2	19 40.9	88.3	20 15.1	87.4	5 00
4 50	19 56.4	92.4	20 31.4	91.6	21 06.2	90.7	21 40.6	89.8	22 14.9	88.9	4 50
40	21 55.9	94.0	22 31.1	93.1	23 05.9	92.2	23 40.4	91.3	24 14.6	90.4	40
30	23 55.3	95.5	24 30.5	94.6	25 05.5	93.7	25 40.1	92.8	26 14.4	91.9	30
20	25 54.4	97.2	26 29.9	96.3	27 05.0	95.3	27 39.7	94.4	28 14.1	93.5	20
10	27 52.9	98.8	28 28.8	97.9	29 04.0	96.9	29 38.9	96.0	30 13.5	95.1	10
4 00	29 51.1	100.5	30 27.1	99.6	31 02.7	98.6	31 37.9	97.7	32 12.7	96.7	4 00
3 50	31 48.7	102.2	32 24.9	101.3	33 00.8	100.3	33 36.4	99.4	34 11.4	98.4	3 50
40	33 45.2	104.0	34 22.0	103.1	34 58.4	102.1	35 34.3	101.1	36 09.7	100.1	40
30	35 41.0	105.9	36 18.4	104.9	36 55.1	103.9	37 31.5	102.9	38 07.2	101.9	30
20	37 35.6	107.8	38 13.5	106.8	38 50.9	105.8	39 27.7	104.8	40 04.1	103.8	20
10	39 28.9	109.8	40 07.5	108.8	40 45.5	107.8	41 23.0	106.8	41 59.9	105.8	10
3 00	41 20.9	111.9	42 00.2	110.9	42 38.9	109.9	43 17.0	108.8	43 54.6	107.8	3 00
2 50	43 11.2	114.2	43 51.2	113.1	44 30.7	112.1	45 09.5	111.0	45 48.0	109.9	2 50
40	44 59.5	116.5	45 40.4	115.4	46 20.8	114.4	47 00.6	113.3	47 39.8	112.2	40
30	46 45.5	119.0	47 27.6	117.9	48 08.9	116.8	48 49.8	115.7	49 29.9	114.6	30
20	48 29.0	121.6	49 12.1	120.5	49 54.6	119.4	50 36.4	118.3	51 17.6	117.1	20
10	50 09.6	124.4	50 53.9	123.3	51 37.4	122.2	52 20.6	121.1	53 02.9	119.9	10
2 00	51 46.7	127.3	52 32.3	126.2	53 17.2	125.1	54 01.5	124.0	54 45.3	122.8	2 00
1 50	53 20.1	130.4	54 07.0	129.3	54 53.4	128.2	55 39.1	127.1	56 24.1	125.9	1 50
40	54 49.0	133.8	55 37.3	132.7	56 25.1	131.6	57 12.3	130.5	57 58.9	129.3	40
30	56 13.0	137.3	57 02.9	136.3	57 52.1	135.3	58 41.0	134.2	59 29.1	133.0	30
20	57 31.1	141.2	58 22.6	140.2	59 13.6	139.2	60 04.0	138.1	60 54.0	137.0	20
10	58 43.0	145.2	59 35.9	144.3	60 28.5	143.4	61 20.8	142.4	62 12.5	141.3	10
1 00	59 47.5	149.6	60 42.1	148.7	61 36.3	147.8	62 30.1	146.9	63 23.5	145.9	1 00
0 50	60 43.9	154.2	61 40.0	153.4	62 35.7	152.6	63 31.2	151.8	64 26.2	150.9	0 50
40	61 31.7	159.0	62 29.0	158.4	63 26.1	157.7	64 23.1	157.0	65 19.8	156.2	40
30	62 09.8	164.0	63 08.1	163.5	64 06.5	163.0	65 04.7	162.4	66 02.8	161.8	30
20	62 37.6	169.3	63 36.8	168.9	64 36.0	168.5	65 35.2	168.1	66 34.3	167.7	20
10	62 54.4	174.6	63 54.2	174.4	64 54.0	174.2	65 53.7	174.0	66 53.5	173.8	10
0 00	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 01.7	66.0	7 00
6 50					0 36.4	69.0	1 14.1	68.3	1 51.7	67.5	6 50
40	1 15.0	72.1	1 52.0	71.3	2 29.0	70.5	3 06.0	69.7	3 43.0	68.9	40
30	3 09.4	73.6	3 45.9	72.8	4 22.4	72.0	4 58.8	71.2	5 35.3	70.4	30
20	5 04.7	75.0	5 40.9	74.2	6 16.9	73.4	6 52.8	72.6	7 28.7	71.8	20
10	7 00.8	76.5	7 36.5	75.7	8 12.1	74.9	8 47.5	74.0	9 22.8	73.2	10
6 00	8 57.6	77.9	9 32.9	77.1	10 08.0	76.3	10 43.1	75.5	11 17.9	74.6	6 00
5 50	10 55.1	79.3	11 30.0	78.5	12 04.8	77.7	12 39.4	76.9	13 13.8	76.0	5 50
40	12 53.1	80.8	13 27.7	80.0	14 02.1	79.1	14 36.3	78.3	15 10.4	77.4	40
30	14 51.6	82.2	15 25.8	81.4	16 00.0	80.5	16 33.9	79.7	17 07.6	78.8	30
20	16 50.5	83.7	17 24.6	82.8	17 58.4	81.9	18 32.0	81.1	19 05.4	80.2	20
10	18 49.7	85.1	19 23.6	84.2	19 57.2	83.3	20 30.6	82.5	21 03.7	81.6	10
5 00	20 49.2	86.6	21 22.9	85.7	21 56.3	84.8	22 29.6	83.9	23 02.4	83.0	5 00
4 50	22 48.8	88.0	23 22.4	87.1	23 55.8	86.2	24 28.8	85.3	25 01.4	84.4	4 50
40	24 48.6	89.5	25 22.1	88.6	25 55.3	87.7	26 28.2	86.7	27 00.8	85.8	40
30	26 48.3	91.0	27 22.0	90.1	27 55.1	89.1	28 28.0	88.2	29 00.3	87.2	30
20	28 48.1	92.6	29 21.7	91.6	29 54.9	90.6	30 27.7	89.7	31 00.1	88.7	20
10	30 47.7	94.1	31 21.4	93.2	31 54.7	92.2	32 27.5	91.2	32 59.9	90.2	10
4 00	32 47.0	95.7	33 20.9	94.8	33 54.3	93.8	34 27.2	92.7	34 59.7	91.7	4 00
3 50	34 46.0	97.4	35 20.1	96.4	35 53.8	95.4	36 26.8	94.3	36 59.3	93.3	3 50
40	36 44.6	99.1	37 19.0	98.1	37 52.8	97.0	38 26.1	96.0	38 58.8	94.9	40
30	38 42.5	100.9	39 17.2	99.8	39 51.4	98.8	40 25.0	97.7	40 58.0	96.6	30
20	40 39.9	102.7	41 15.0	101.6	41 49.6	100.5	42 23.5	99.4	42 56.8	98.3	20
10	42 36.2	104.6	43 12.0	103.5	43 47.0	102.4	44 21.4	101.3	44 55.1	100.1	10
3 00	44 31.5	106.7	45 07.8	105.5	45 43.4	104.4	46 18.4	103.2	46 52.6	102.0	3 00
2 50	46 25.7	108.8	47 02.7	107.7	47 39.0	106.5	48 14.5	105.3	48 49.2	104.0	2 50
40	48 18.3	111.0	48 56.1	109.9	49 33.1	108.6	50 09.5	107.4	50 45.0	106.1	40
30	50 09.1	113.4	50 48.0	112.2	51 26.0	111.0	52 03.1	109.7	52 39.4	108.4	30
20	51 58.1	115.9	52 37.8	114.7	53 16.7	113.5	53 54.9	112.2	54 32.3	110.8	20
10	53 44.5	119.7	54 25.5	117.4	55 05.6	116.1	55 44.9	114.8	56 23.2	113.4	10
2 00	55 28.2	121.6	56 10.4	120.3	56 51.8	119.0	57 32.3	117.6	58 12.0	116.2	2 00
1 50	57 08.5	124.7	57 52.0	123.4	58 35.0	122.1	59 17.0	120.7	59 58.0	119.3	1 50
40	58 44.9	128.1	59 30.1	126.8	60 14.4	125.5	60 58.1	124.1	61 40.8	122.6	40
30	60 16.8	131.8	61 03.8	130.5	61 49.9	129.2	62 35.1	127.8	63 19.6	126.3	30
20	61 43.3	135.8	62 32.0	134.6	63 19.9	133.2	64 07.1	131.8	64 53.6	130.3	20
10	63 03.5	140.1	63 54.1	138.9	64 44.1	137.6	65 33.2	136.3	66 22.0	134.8	10
1 00	64 16.5	144.8	65 09.0	143.7	66 00.9	142.5	66 52.3	141.2	67 43.2	139.8	1 00
0 50	65 21.2	149.9	66 15.7	148.9	67 10.0	147.8	68 03.0	146.6	68 56.0	145.3	0 50
40	66 16.3	155.4	67 12.4	154.5	68 08.3	153.5	69 03.8	152.5	69 58.9	151.3	40
30	67 00.5	161.2	67 58.5	160.5	68 56.2	159.7	69 53.2	158.9	70 50.4	157.9	30
20	67 33.3	167.3	68 32.2	166.8	69 31.2	166.2	70 29.9	165.6	71 28.5	165.0	20
10	67 53.3	173.6	68 53.0	173.3	69 52.7	173.0	70 52.4	172.7	71 52.0	172.4	10
0 00	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	▫	° ′	▫	° ′	°	° ′	°	° ′	°	h. m.
7 10					0 09.5	62.3	0 48.3	61.4	1 27.2	60.6	7 10
7 00	0 39.9	65.2	1 18.0	64.4	1 56.2	63.7	2 34.4	62.9	3 12.5	62.1	7 00
6 50	2 29.2	66.6	3 06.7	65.9	3 44.2	65.1	4 21.7	64.3	4 59.0	63.5	6 50
40	4 19.9	68.1	4 56.8	67.4	5 33.5	66.6	6 10.3	65.8	6 47.0	65.0	40
30	6 11.4	69.6	6 47.8	68.8	7 23.9	66.6	8 00.0	67.2	8 36.0	66.4	30
20	8 04.4	71.0	8 40.0	70.2	9 15.6	69.4	9 51.1	68.6	10 26.4	67.8	20
10	9 58.1	72.4	10 33.2	71.6	11 08.2	70.8	11 42.9	69.9	12 17.7	69.1	10
6 00	11 52.7	73.8	12 27.3	73.0	13 01.8	72.1	13 36.0	71.3	14 10.1	70.4	6 00
5 50	13 48.1	75.2	14 22.2	74.3	14 56.2	73.5	15 29.8	72.7	16 03.4	71.8	5 50
40	15 44.3	76.6	16 17.9	75.7	16 51.4	74.8	17 24.7	74.0	17 57.7	73.1	40
30	17 41.0	78.0	18 14.3	77.1	18 47.3	76.2	19 20.2	75.3	19 52.6	74.4	30
20	19 38.6	79.3	20 11.5	78.4	20 44.1	77.5	21 16.4	76.6	21 48.4	75.7	20
10	21 36.5	80.7	22 09.1	79.8	22 41.2	78.8	23 13.2	77.9	23 44.7	77.0	10
5 00	23 35.0	82.1	24 07.2	81.1	24 39.1	80.2	25 10.7	79.3	25 41.8	78.3	5 00
4 50	25 33.7	83.4	26 05.7	82.5	26 37.3	81.5	27 08.6	80.6	27 39.3	79.6	4 50
40	27 32.9	84.8	28 04.7	83.9	28 36.0	82.9	29 07.0	81.9	29 37.5	80.9	40
30	29 32.2	86.3	30 04.0	85.3	30 35.0	84.3	31 05.7	83.3	31 36.0	82.3	30
20	31 32.0	87.7	32 03.5	86.7	32 34.5	85.7	33 05.0	84.7	33 34.9	83.7	20
10	33 31.7	89.2	34 03.1	88.2	34 33.9	87.1	35 04.3	86.1	35 34.0	85.0	10
4 00	35 31.6	90.7	36 02.9	89.6	36 33.7	88.6	37 03.9	87.5	37 33.5	86.4	4 00
3 50	37 31.3	92.2	38 02.7	91.2	38 33.4	90.1	39 03.6	88.9	39 33.1	87.8	3 50
40	39 30.9	93.8	40 02.4	92.7	40 33.2	91.6	41 03.5	90.4	41 33.0	89.3	40
30	41 30.2	95.4	42 01.9	94.3	42 32.8	93.2	43 03.2	92.0	43 32.7	90.8	30
20	43 29.4	97.2	44 01.3	96.0	44 32.5	94.8	45 02.9	93.6	45 32.4	92.4	20
10	45 28.0	99.0	46 00.2	97.7	46 31.6	96.5	47 02.4	95.3	47 32.0	94.0	10
3 00	47 26.0	100.8	47 58.6	99.6	48 30.4	98.3	49 01.4	97.0	49 31.4	95.7	3 00
2 50	49 23.2	102.8	49 56.5	101.5	50 28.7	100.2	51 00.1	98.8	51 30.4	97.4	2 50
40	51 19.6	104.8	51 53.4	103.5	52 26.3	102.1	52 58.3	100.7	53 29.0	99.3	40
30	53 14.7	107.1	53 49.2	105.7	54 22.8	104.3	54 55.3	102.8	55 26.7	101.3	30
20	55 08.6	109.4	55 43.9	108.0	56 18.4	106.5	56 51.8	105.0	57 23.8	103.5	20
10	57 00.6	112.0	57 37.1	110.5	58 12.5	109.0	58 46.6	107.4	59 19.6	105.8	10
2 00	58 50.6	114.8	59 28.2	113.3	60 04.8	111.7	60 40.1	110.0	61 14.4	108.3	2 00
1 50	60 38.0	117.8	61 17.1	116.2	61 55.0	114.6	62 31.7	112.9	63 07.0	111.1	1 50
40	62 22.5	121.1	63 03.0	119.5	63 42.5	117.8	64 20.8	116.0	64 57.6	114.2	40
30	64 02.9	124.7	64 45.4	123.1	65 26.7	121.4	66 06.7	119.5	66 45.2	117.6	30
20	65 39.0	128.8	66 23.3	127.1	67 06.7	125.4	68 48.8	123.5	69 29.6	121.5	20
10	67 09.2	133.3	67 56.1	131.6	68 41.5	129.9	69 26.2	128.0	70 29.5	126.0	10
1 00	68 33.0	138.3	69 22.2	136.7	70 10.1	135.0	70 57.3	133.1	71 42.9	131.1	1 00
0 50	69 48.0	143.9	70 39.7	142.4	71 30.6	140.8	72 20.2	139.0	73 09.2	137.0	0 50
40	70 53.5	150.1	71 47.5	148.7	72 41.1	147.3	73 34.0	145.6	74 25.7	143.8	40
30	71 47.0	156.9	72 43.4	155.7	73 39.5	154.5	74 34.7	153.2	75 29.5	151.6	30
20	72 27.0	164.2	73 25.3	163.4	74 23.4	162.5	75 21.2	161.5	76 18.7	160.3	20
10	72 51.6	172.0	73 51.2	171.6	74 50.7	171.1	75 50.1	170.5	76 49.5	169.9	10
0 00	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	77 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

68° 29.6 70° 09.2

67° 48.8

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 59.8	91.5	1 23.7	92.3	0 47.4	93.1	0 11.3	93.9			5 50
40	3 59.5	93.0	3 23.3	93.8	2 47.0	94.6	2 10.8	95.4	1 34.5	96.2	40
30	5 59.0	94.5	5 22.6	95.3	4 46.2	96.1	4 09.8	96.9	3 33.2	97.7	30
20	7 58.3	96.1	7 21.8	96.9	6 45.2	97.7	6 08.5	98.5	5 31.8	99.3	20
10	9 57.2	97.6	9 20.6	98.4	8 43.6	99.2	8 06.8	100.0	7 29.8	100.8	10
5 00	11 55.8	99.2	11 18.8	100.0	10 41.7	100.8	10 04.5	101.6	9 27.1	102.4	5 00
4 50	13 53.8	100.8	13 16.6	101.6	12 39.0	102.4	12 01.4	103.2	11 23.8	104.0	4 50
40	15 51.1	102.4	15 13.5	103.2	14 35.7	104.0	13 57.7	104.8	13 19.6	105.6	40
30	17 47.8	104.0	17 09.8	104.8	16 31.4	105.6	15 53.1	106.4	15 14.4	107.2	30
20	19 43.6	105.7	19 05.1	106.5	18 26.4	107.3	17 47.5	108.1	17 08.4	108.9	20
10	21 38.4	107.4	20 59.4	108.2	20 20.2	109.0	19 40.8	109.8	19 01.1	110.6	10
4 00	23 32.1	109.2	22 52.6	110.0	22 12.8	110.8	21 32.8	111.6	20 52.6	112.4	4 00
3 50	25 24.6	111.0	24 44.6	111.8	24 04.2	112.6	23 23.5	113.4	22 42.6	114.2	3 50
40	27 15.8	112.9	26 35.1	113.7	25 54.0	114.5	25 12.6	115.3	24 31.1	116.1	40
30	29 05.4	114.8	28 24.0	115.6	27 42.1	116.4	27 00.1	117.2	26 17.8	118.0	30
20	30 53.2	116.8	30 11.0	117.6	29 28.5	118.4	28 45.6	119.2	28 02.5	120.0	20
10	32 39.2	118.9	31 56.2	119.7	31 12.8	120.5	30 29.2	121.3	29 45.1	122.1	10
3 00	34 23.0	121.1	33 39.1	121.9	32 54.8	122.7	32 10.2	123.5	31 25.4	124.3	3 00
2 50	36 04.4	123.3	35 19.6	124.1	34 34.3	124.9	33 48.8	125.7	33 03.0	126.5	2 50
40	37 43.1	125.7	36 57.3	126.5	36 11.2	127.3	35 24.8	128.1	34 38.0	128.8	40
30	39 19.0	128.1	38 32.2	128.9	37 44.9	129.7	36 57.4	130.5	36 09.7	131.2	30
20	40 51.6	130.7	40 03.7	131.5	39 15.5	132.2	38 26.9	133.0	37 38.1	133.7	20
10	42 20.5	133.4	41 31.6	134.2	40 42.2	134.9	39 52.6	135.7	39 02.8	136.4	10
2 00	43 45.6	136.2	42 55.4	137.0	42 05.0	137.7	41 14.3	138.4	40 23.3	139.1	2 00
1 50	45 06.2	139.1	44 15.0	139.9	43 23.4	140.6	42 31.6	141.3	41 39.5	141.9	1 50
40	46 22.2	142.2	45 29.7	142.9	44 37.0	143.6	43 44.0	144.3	42 50.8	144.9	40
30	47 32.8	145.5	46 39.3	146.1	45 45.4	146.8	44 51.3	147.4	43 57.0	148.0	30
20	48 37.9	148.8	47 43.1	149.4	46 48.2	150.0	45 53.1	150.6	44 57.8	151.2	20
10	49 36.6	152.4	48 40.9	152.9	47 44.9	153.4	46 48.8	154.0	45 52.5	154.5	10
1 00	50 28.9	156.0	49 32.1	156.5	48 35.1	157.0	47 38.1	157.5	46 40.9	157.9	1 00
0 50	51 14.0	159.8	50 16.2	160.2	49 18.5	160.6	48 20.6	161.0	47 22.6	161.4	0 50
40	51 51.6	163.7	50 53.2	164.0	49 54.6	164.4	48 55.9	164.7	47 57.2	165.0	40
30	52 21.3	167.7	51 22.2	167.9	50 23.0	168.2	49 23.8	168.4	48 24.4	168.7	30
20	52 42.7	171.7	51 43.1	171.9	50 43.5	172.1	49 43.8	172.3	48 44.2	172.4	20
10	52 55.7	175.8	51 55.8	175.9	50 55.8	176.0	49 55.9	176.1	48 56.0	176.2	10
0 00	53 0.0	180.0	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 58.1	97.0	0 21.8	97.8							5 40
30	2 56.8	98.5	2 20.2	99.3	1 43.6	100.1	1 06.9	100.9	0 30.3	101.7	30
20	4 55.0	100.0	4 18.1	100.8	3 41.2	101.6	3 04.2	102.4	2 27.3	103.2	20
10	6 52.6	101.5	6 15.4	102.3	5 38.3	103.1	5 00.9	103.9	4 23.5	104.7	10
5 00	8 49.7	103.1	8 12.1	103.9	7 34.5	104.7	6 56.8	105.5	6 19.0	106.3	5 00
4 50	10 45.9	104.7	10 08.0	105.5	9 29.9	106.3	8 51.7	107.1	8 13.5	107.9	4 50
40	12 41.3	106.3	12 02.9	107.1	11 24.4	107.9	10 45.7	108.7	10 07.0	109.5	40
30	14 35.8	108.0	13 56.9	108.8	13 17.9	109.6	12 38.6	110.3	11 59.3	111.1	30
20	16 29.1	109.7	15 49.7	110.5	15 10.0	111.3	14 30.4	112.0	13 50.5	112.8	20
10	18 21.3	111.4	17 41.3	112.2	17 01.1	113.0	16 20.8	113.7	15 40.1	114.5	10
4 00	20 12.1	113.2	19 31.5	114.0	18 50.6	114.7	18 09.5	115.5	17 28.3	116.3	4 00
3 50	22 01.5	115.0	21 20.2	115.8	20 38.7	116.5	19 56.9	117.3	19 14.9	118.1	3 50
40	23 49.3	116.9	23 07.2	117.7	22 25.0	118.4	21 42.5	119.2	20 59.8	119.9	40
30	25 35.2	118.8	24 52.4	119.6	24 09.4	120.3	23 26.0	121.1	22 42.5	121.8	30
20	27 19.2	120.8	26 35.5	121.6	25 51.6	122.3	25 07.5	123.1	24 23.2	123.8	20
10	29 00.9	122.9	28 16.5	123.7	27 31.8	124.4	26 46.7	125.1	26 01.5	125.8	10
3 00	30 40.3	125.0	29 54.8	125.8	29 09.2	126.5	28 23.3	127.3	27 37.2	128.0	3 00
2 50	32 17.1	127.2	31 30.8	128.0	30 44.2	128.7	29 57.3	129.5	29 10.2	130.2	2 50
40	33 51.0	129.5	33 03.6	130.3	32 16.1	131.0	31 28.3	131.7	30 40.3	132.4	40
30	35 21.7	131.9	34 33.4	132.7	33 44.8	133.4	32 56.0	134.1	32 07.1	134.8	30
20	36 49.1	134.5	35 59.7	135.2	35 10.1	135.9	34 20.3	136.5	33 30.3	137.2	20
10	38 12.6	137.1	37 22.2	137.7	36 31.6	138.4	35 40.7	139.1	34 49.7	139.7	10
2 00	39 32.1	139.8	38 40.6	140.4	37 49.0	141.1	36 57.1	141.7	36 05.1	142.3	2 00
1 50	40 47.2	142.6	39 54.8	143.2	39 02.0	143.9	38 09.1	144.5	37 16.1	145.0	1 50
40	41 57.5	145.5	41 03.9	146.1	40 10.2	146.7	39 16.3	147.3	38 22.3	147.8	40
30	43 02.8	148.6	42 08.2	149.1	41 13.5	149.7	40 18.5	150.2	39 23.5	150.7	30
20	44 02.4	151.7	43 06.8	152.2	42 11.1	152.7	41 15.3	153.2	40 19.3	153.7	20
10	44 56.2	155.0	43 59.8	155.4	43 03.1	155.9	42 06.4	156.3	41 09.5	156.8	10
1 00	45 43.7	158.3	44 46.4	158.7	43 48.8	159.1	42 51.3	159.5	41 53.8	159.9	1 00
0 50	46 24.5	161.8	45 26.5	162.1	44 28.2	162.5	43 30.5	162.8	42 31.7	163.1	0 50
40	46 58.5	165.3	45 59.7	165.6	45 00.9	165.9	44 02.0	166.2	43 03.1	166.4	40
30	47 25.1	168.9	46 25.9	169.1	45 26.6	169.4	44 27.3	169.6	43 27.9	169.8	30
20	47 44.5	172.6	46 44.9	172.7	45 45.1	172.9	44 45.4	173.0	43 45.7	173.2	20
10	47 56.1	176.3	46 56.2	176.4	45 56.2	176.4	44 56.3	176.5	43 56.5	176.6	10
0 00	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 50.3	104.0	1 13.2	104.8	0 36.2	105.5					5 20
10	3 46.2	105.5	3 08.7	106.3	2 31.3	107.1	1 53.7	107.9	1 16.1	108.6	10
5 00	5 41.2	107.1	5 03.2	107.9	4 25.2	108.6	3 47.2	109.4	3 09.1	110.2	5 00
4 50	7 35.2	108.7	6 56.7	109.4	6 18.2	110.2	5 39.5	111.0	5 00.9	111.7	4 50
40	9 28.1	110.3	8 49.1	111.0	8 10.0	111.8	7 30.9	112.6	6 51.6	113.3	40
30	11 19.9	111.9	10 40.3	112.6	10 00.7	113.4	9 20.8	114.2	8 40.9	114.9	30
20	13 10.4	113.6	12 30.2	114.3	11 49.9	115.1	11 09.3	115.8	10 28.8	116.6	20
10	14 59.4	115.3	14 18.6	116.0	13 37.6	116.8	12 56.4	117.5	12 15.1	118.3	10
4 00	16 47.0	117.0	16 05.4	117.8	15 23.7	118.5	14 41.8	119.3	13 59.8	120.0	4 00
3 50	18 33.0	118.8	17 50.6	119.6	17 08.0	120.3	16 25.3	121.1	15 42.6	121.8	3 50
40	20 16.8	120.7	19 33.7	121.4	18 50.4	122.2	18 07.0	122.9	17 23.4	123.6	40
30	21 58.8	122.6	21 15.0	123.3	20 30.9	124.1	19 46.7	124.8	19 02.1	125.5	30
20	23 38.6	124.6	22 53.9	125.3	22 08.9	126.0	21 23.8	126.7	20 38.5	127.4	20
10	25 16.0	126.6	24 30.4	127.3	23 44.6	128.0	22 58.6	128.7	22 12.4	129.4	10
3 00	26 50.9	128.7	26 04.4	129.4	25 17.6	130.1	24 30.6	130.8	23 43.5	131.5	3 00
2 50	28 23.1	130.9	27 35.5	131.6	26 47.8	132.3	25 59.9	132.9	25 11.8	133.6	2 50
40	29 52.0	133.1	29 03.6	133.8	28 14.9	134.5	27 26.1	135.1	26 37.0	135.8	40
30	31 17.8	135.5	30 28.4	136.1	29 38.8	136.8	28 48.9	137.4	27 58.8	138.0	30
20	32 40.0	137.9	31 49.6	138.5	30 59.0	139.1	30 08.2	139.7	29 17.2	140.3	20
10	33 58.5	140.4	33 07.1	141.0	32 15.4	141.6	31 23.7	142.2	30 31.7	142.7	10
2 00	35 12.8	142.9	34 20.4	143.5	33 27.8	144.1	32 35.0	144.7	31 42.2	145.2	2 00
1 50	36 22.8	145.6	35 29.4	146.2	34 35.8	146.7	33 42.1	147.3	32 48.2	147.8	1 50
40	37 28.0	148.4	36 33.7	148.9	35 39.2	149.4	34 44.5	149.9	33 49.7	150.4	40
30	38 28.4	151.2	37 33.0	151.7	36 37.6	152.2	35 42.0	152.7	34 46.3	153.1	30
20	39 23.3	154.2	38 27.1	154.6	37 30.8	155.1	36 34.5	155.5	35 38.0	155.9	20
10	40 12.6	157.2	39 15.6	157.6	38 18.5	158.0	37 21.3	158.4	36 24.1	158.8	10
1 00	40 56.1	160.3	39 58.3	160.6	39 00.6	161.0	38 02.7	161.3	37 04.8	161.7	1 00
0 50	41 33.3	163.5	40 34.9	163.8	39 36.5	164.1	38 38.0	164.3	37 39.4	164.6	0 50
40	42 04.2	166.7	41 05.2	166.9	40 06.2	167.2	39 07.2	167.4	38 08.2	167.6	40
30	42 28.5	170.0	41 29.1	170.1	40 29.7	170.3	39 30.1	170.5	38 30.7	170.7	30
20	42 46.0	173.3	41 46.2	173.4	40 45.9	173.5	39 46.7	173.7	38 47.0	173.8	20
10	42 56.5	176.6	41 56.6	176.7	40 56.6	176.7	39 56.7	176.8	38 56.8	176.9	10
0 00	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

46.5

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 38.5	109.5	0 00.9	110.2							5 10
5 00	2 31.0	111.0	1 52.8	111.7	1 14.7	112.5	0 36.5	113.3			5 00
4 50	4 22.1	112.5	3 43.5	113.2	3 04.7	114.0	2 25.9	114.8	1 47.1	115.5	4 50
40	6 12.3	114.1	5 32.9	114.8	4 53.5	115.6	4 13.9	116.3	3 34.4	117.1	40
30	8 00.9	115.7	7 20.9	116.4	6 40.8	117.2	6 00.6	117.9	5 20.2	118.7	30
20	9 48.2	117.3	9 07.4	118.1	8 26.6	118.8	7 45.6	119.6	7 04.6	120.3	20
10	11 33.8	119.0	10 52.3	119.8	10 10.6	120.5	9 28.9	121.2	8 47.2	121.9	10
4 00	13 17.6	120.7	12 35.3	121.5	11 53.0	122.2	11 10.5	122.9	10 27.9	123.6	4 00
3 50	14 59.7	122.5	14 16.7	123.2	13 33.4	123.9	12 50.1	124.6	12 06.6	125.3	3 50
40	16 39.7	124.3	15 55.8	125.0	15 11.8	125.7	14 27.5	126.4	13 43.2	127.1	40
30	18 17.4	126.2	17 32.8	126.9	16 47.8	127.6	16 02.8	128.3	15 17.6	129.0	30
20	19 53.0	128.1	19 07.3	128.8	18 21.6	129.5	17 35.6	130.2	16 49.5	130.8	20
10	21 25.9	130.1	20 39.4	130.8	19 52.7	131.4	19 05.9	132.1	18 18.9	132.7	10
3 00	22 56.2	132.1	22 08.7	132.8	21 21.1	133.4	20 33.4	134.1	19 45.4	134.7	3 00
2 50	24 23.5	134.2	23 35.1	134.9	22 46.5	135.5	21 57.9	136.2	21 08.9	136.8	2 50
40	25 47.8	136.4	24 58.4	137.0	24 08.9	137.6	23 19.3	138.3	22 29.4	138.9	40
30	27 08.7	138.6	26 18.4	139.2	25 27.9	139.8	24 37.2	140.5	23 46.6	141.0	30
20	28 26.0	140.9	27 34.7	141.5	26 43.3	142.1	25 51.8	142.7	25 00.1	143.2	20
10	29 39.6	143.3	28 47.4	143.9	27 54.9	144.5	27 02.4	145.0	26 09.8	145.5	10
2 00	30 49.1	145.8	29 55.9	146.3	29 02.6	146.9	28 09.2	147.4	27 15.6	147.9	2 00
1 50	31 54.2	148.3	31 00.1	148.8	30 05.8	149.3	29 11.7	149.8	28 17.2	150.3	1 50
40	32 54.8	150.9	31 59.9	151.4	31 04.8	151.9	30 09.6	152.3	29 14.4	152.8	40
30	33 50.7	153.6	32 54.8	154.0	31 58.8	154.5	31 02.9	154.9	30 06.8	155.3	30
20	34 41.4	156.3	33 44.8	156.7	32 48.1	157.1	31 51.3	157.5	30 54.4	157.9	20
10	35 26.8	159.1	34 29.5	159.5	33 32.1	159.8	32 34.6	160.2	31 37.1	160.5	10
1 00	36 06.7	162.0	35 08.7	162.3	34 10.6	162.6	33 12.5	162.9	32 14.4	163.2	1 00
0 50	36 40.9	164.9	35 42.4	165.2	34 43.8	165.4	33 45.0	165.7	32 46.3	165.9	0 50
40	37 09.1	167.9	36 10.1	168.1	35 11.0	168.3	34 11.8	168.5	33 12.6	168.7	40
30	37 31.2	170.9	36 31.8	171.0	35 32.3	171.2	34 32.8	171.3	33 33.3	171.5	30
20	37 47.2	173.9	36 47.4	174.0	35 47.6	174.1	34 47.9	174.2	33 48.1	174.3	20
10	37 56.8	176.9	36 56.8	177.0	35 56.9	177.1	34 57.0	177.1	33 57.1	177.2	10
0 00	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	1 08. 2	116. 3	0 29. 3	117. 1							4 50
40	2 54. 8	117. 9	2 15. 2	118. 6	1 35. 6	119. 4	0 56. 0	120. 1	0 16. 4	120. 9	40
30	4 39. 9	119. 4	3 59. 7	120. 2	3 19. 2	120. 9	2 38. 8	121. 6	1 58. 3	122. 4	30
20	6 23. 5	121. 0	5 42. 3	121. 8	5 01. 1	122. 5	4 19. 9	123. 2	3 38. 6	124. 0	20
10	8 05. 2	122. 7	7 23. 3	123. 4	6 41. 2	124. 1	5 59. 2	124. 8	5 17. 0	125. 5	10
4 00	9 45. 2	124. 4	9 02. 4	125. 1	8 19. 5	125. 8	7 36. 6	126. 5	6 53. 6	127. 1	4 00
3 50	11 23. 1	126. 1	10 39. 4	126. 8	9 55. 7	127. 5	9 11. 9	128. 2	8 28. 0	128. 8	3 50
40	12 58. 8	127. 8	12 14. 3	128. 5	11 29. 7	129. 2	10 45. 0	129. 9	10 00. 2	130. 5	40
30	14 32. 2	129. 6	13 46. 8	130. 3	13 01. 3	131. 0	12 15. 7	131. 6	11 30. 0	132. 3	30
20	16 03. 3	131. 5	15 17. 0	132. 2	14 30. 5	132. 8	13 44. 0	133. 4	12 57. 3	134. 1	20
10	17 31. 7	133. 4	16 44. 4	134. 1	15 57. 1	134. 7	15 09. 6	135. 3	14 22. 0	135. 9	10
3 00	18 57. 4	135. 4	18 09. 2	136. 0	17 20. 9	136. 6	16 32. 4	137. 2	15 43. 9	137. 8	3 00
2 50	20 19. 9	137. 4	19 30. 8	138. 0	18 41. 6	138. 6	17 52. 2	139. 2	17 02. 7	139. 8	2 50
40	21 39. 5	139. 5	20 49. 5	140. 1	19 59. 2	140. 6	19 08. 9	141. 2	18 18. 5	141. 8	40
30	22 55. 7	141. 6	22 04. 6	142. 2	21 13. 4	142. 7	20 22. 2	143. 3	19 30. 8	143. 9	30
20	24 08. 3	143. 8	23 16. 3	144. 4	22 24. 2	144. 9	21 32. 1	145. 4	20 39. 8	146. 0	20
10	25 17. 0	146. 1	24 24. 2	146. 6	23 31. 2	147. 1	22 38. 1	147. 6	21 44. 9	148. 1	2 10
2 00	26 21. 9	148. 4	25 28. 2	148. 9	24 34. 4	149. 4	23 40. 4	149. 8	22 46. 4	150. 3	2 00
1 50	27 22. 6	150. 8	26 28. 0	151. 2	25 33. 3	151. 7	24 38. 5	152. 1	23 43. 6	152. 6	1 50
40	28 19. 0	153. 2	27 23. 5	153. 6	26 28. 0	154. 1	25 32. 4	154. 5	24 36. 7	154. 9	40
30	29 10. 6	155. 7	28 14. 4	156. 1	27 18. 2	156. 5	26 21. 7	156. 8	25 25. 2	157. 2	30
20	29 57. 5	158. 2	29 00. 6	158. 6	28 03. 6	158. 9	27 06. 5	159. 3	26 09. 4	159. 6	20
10	30 39. 4	160. 8	29 41. 8	161. 1	28 44. 1	161. 4	27 46. 4	161. 7	26 48. 6	162. 0	10
1 00	31 16. 2	163. 5	30 18. 0	163. 8	29 19. 7	164. 0	28 21. 4	164. 3	27 23. 0	164. 5	1 00
0 50	31 47. 5	166. 2	30 48. 7	166. 4	29 49. 7	166. 6	28 51. 2	166. 8	27 52. 4	167. 0	0 50
40	32 13. 4	168. 9	31 14. 3	169. 1	30 15. 0	169. 3	29 15. 9	169. 4	28 16. 6	169. 6	40
30	32 33. 7	171. 6	31 34. 2	171. 8	30 34. 7	171. 9	29 35. 1	172. 0	28 35. 5	172. 2	30
20	32 48. 3	174. 4	31 48. 5	174. 5	30 48. 7	174. 6	29 48. 9	174. 7	28 49. 1	174. 8	20
10	32 57. 1	177. 2	31 57. 2	177. 3	30 57. 2	177. 3	29 57. 2	177. 3	28 57. 2	177. 4	10
0 00	33 0. 0	180. 0	32 0. 0	180. 0	31 0. 0	180. 0	30 0. 0	180. 0	29 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 29.8	85.3	6 10
6 00	0 00.0	90.0	0 36.9	89.2	1 13.9	88.4	1 50.8	87.6	2 27.7	86.9	6 00
5 50	1 58.2	91.5	2 35.2	90.7	3 12.1	89.9	3 49.0	89.2	4 25.8	88.4	5 50
40	3 56.3	93.1	4 33.3	92.3	5 10.3	91.5	5 47.2	90.7	6 24.0	89.9	40
30	5 54.2	94.6	6 31.4	93.8	7 08.3	93.0	7 45.3	92.2	8 22.2	91.4	30
20	7 51.9	96.2	8 29.1	95.4	9 06.3	94.6	9 43.3	93.8	10 20.2	93.0	20
10	9 49.2	97.8	10 26.8	97.0	11 04.1	96.2	11 41.2	95.4	12 18.2	94.6	10
5 00	11 46.1	99.4	12 23.8	98.6	13 01.3	97.8	13 38.7	97.0	14 15.9	96.2	5 00
4 50	13 42.4	101.0	14 20.4	100.2	14 58.2	99.4	15 35.8	98.6	16 13.2	97.8	4 50
40	15 38.1	102.6	16 16.4	101.8	16 54.5	101.0	17 32.4	100.2	18 10.1	99.4	40
30	17 33.0	104.3	18 11.8	103.5	18 50.2	102.7	19 28.4	101.9	20 06.4	101.1	30
20	19 27.2	106.0	20 06.3	105.2	20 45.1	104.4	21 23.7	103.6	22 02.1	102.8	20
10	21 20.2	107.8	21 59.8	107.0	22 39.2	106.1	23 18.2	105.3	23 56.9	104.5	10
4 00	23 12.2	109.6	23 52.3	108.8	24 32.1	107.9	25 11.6	107.1	25 50.9	106.3	4 00
3 50	25 02.9	111.4	25 43.6	110.6	26 23.9	109.8	27 04.1	108.9	27 43.8	108.1	3 50
40	26 52.3	113.3	27 33.5	112.5	28 14.5	111.7	28 55.2	110.8	29 35.5	110.0	40
30	28 40.0	115.3	29 22.0	114.5	30 03.6	113.7	30 44.9	112.8	31 26.0	112.0	30
20	30 26.0	117.3	31 08.7	116.5	31 51.1	115.7	32 33.1	114.8	33 14.8	114.0	20
10	32 09.9	119.4	32 53.4	118.6	33 36.6	117.8	34 19.5	116.9	35 01.9	116.1	10
3 00	33 51.8	121.6	34 36.1	120.8	35 20.1	120.0	36 03.7	119.1	36 47.0	118.3	3 00
2 50	35 31.1	123.9	36 16.4	123.1	37 01.3	122.3	37 45.9	121.4	38 30.0	120.6	2 50
40	37 07.9	126.3	37 54.1	125.5	38 39.9	124.6	39 25.4	123.8	40 10.5	122.9	40
30	38 41.6	128.8	39 28.8	128.0	40 15.8	127.1	41 02.2	126.3	41 48.3	125.4	30
20	40 12.2	131.3	41 00.4	130.5	41 48.3	129.7	42 35.9	128.9	43 23.0	128.1	20
10	41 39.0	134.0	42 28.4	133.3	43 17.3	132.5	44 06.0	131.7	44 54.2	130.9	10
2 00	43 02.1	136.8	43 52.5	136.1	44 42.5	135.3	45 32.3	134.5	46 21.7	133.7	2 00
1 50	44 20.6	139.8	45 12.2	139.1	46 03.5	138.3	46 54.6	137.6	47 45.0	136.8	1 50
40	45 34.5	142.9	46 27.1	142.2	47 19.6	141.5	48 11.7	140.7	49 03.5	140.0	40
30	46 43.2	146.1	47 37.0	145.4	48 30.6	144.7	49 23.9	144.0	50 16.9	143.3	30
20	47 46.4	149.4	48 41.3	148.8	49 35.9	148.2	50 30.4	147.5	51 24.6	146.8	20
10	48 43.2	152.9	49 39.4	152.4	50 35.2	151.8	51 30.8	151.2	52 26.1	150.5	10
1 00	49 34.0	156.5	50 30.9	156.0	51 27.6	155.5	52 24.3	154.9	53 20.7	154.4	1 00
0 50	50 17.6	160.2	51 15.4	159.8	52 13.0	159.3	53 10.6	158.9	54 08.1	158.4	0 50
40	50 54.0	164.0	51 52.5	163.7	52 51.0	163.3	53 49.4	162.9	54 47.7	162.5	40
30	51 22.6	167.9	52 21.8	167.6	53 20.9	167.3	54 20.1	167.1	55 19.1	166.8	30
20	51 43.3	171.9	52 42.9	171.7	53 42.5	171.5	54 42.1	171.3	55 41.6	171.1	20
10	51 55.8	175.9	52 55.7	175.8	53 55.6	175.7	54 55.5	175.6	55 55.4	175.5	10
0 00	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 23. 5	81. 4	1 00. 7	80. 7	1 37. 9	79. 9	6 20
10	1 06. 8	84. 5	1 43. 8	83. 7	2 20. 7	82. 9	2 57. 7	82. 2	3 34. 6	81. 4	10
6 00	3 04. 6	86. 1	3 41. 4	85. 3	4 18. 2	84. 5	4 54. 9	83. 7	5 31. 6	82. 9	6 00
5 50	5 02. 6	87. 6	5 39. 3	86. 8	6 15. 9	86. 0	6 52. 6	85. 2	7 29. 1	84. 4	5 50
40	7 00. 8	89. 1	7 37. 4	88. 3	8 14. 0	87. 5	8 50. 5	86. 7	9 26. 9	85. 9	40
30	8 59. 0	90. 6	9 35. 6	89. 8	10 12. 1	89. 0	10 48. 5	88. 2	11 24. 9	87. 4	30
20	10 57. 0	92. 2	11 33. 7	91. 4	12 10. 3	90. 6	12 46. 7	89. 8	13 23. 0	89. 0	20
10	12 55. 2	93. 8	13 31. 9	92. 9	14 08. 5	92. 1	14 44. 9	91. 3	15 21. 1	90. 5	10
5 00	14 53. 0	95. 4	15 29. 9	94. 5	16 06. 6	93. 7	16 43. 1	92. 9	17 19. 4	92. 1	5 00
4 50	16 50. 5	97. 0	17 27. 5	96. 1	18 04. 4	95. 3	18 41. 0	94. 5	19 17. 4	93. 6	4 50
40	18 47. 6	98. 6	19 24. 9	97. 8	20 01. 9	96. 9	20 38. 7	96. 1	21 15. 2	95. 2	40
30	20 44. 2	100. 2	21 21. 8	99. 4	21 59. 0	98. 6	22 36. 0	97. 7	23 12. 8	96. 8	30
20	22 40. 2	101. 9	23 18. 1	101. 1	23 55. 7	100. 2	24 33. 0	99. 4	25 10. 0	98. 5	20
10	24 35. 6	103. 6	25 13. 7	102. 8	25 51. 5	101. 9	26 29. 3	101. 1	27 06. 5	100. 2	10
4 00	26 29. 9	105. 4	27 08. 5	104. 6	27 46. 9	103. 7	28 24. 9	102. 8	29 02. 5	101. 9	4 00
3 50	28 23. 3	107. 2	29 02. 4	106. 4	29 41. 2	105. 5	30 19. 7	104. 6	30 57. 8	103. 7	3 50
40	30 15. 5	109. 1	30 55. 3	108. 3	31 34. 6	107. 4	32 13. 6	106. 5	32 52. 2	105. 6	40
30	32 06. 7	111. 1	32 46. 9	110. 2	33 26. 8	109. 3	34 06. 4	108. 4	34 45. 5	107. 5	30
20	33 56. 1	113. 1	34 37. 1	112. 2	35 17. 7	111. 3	35 57. 9	110. 4	36 37. 6	109. 5	20
10	35 44. 0	115. 2	36 25. 7	114. 3	37 07. 0	113. 4	37 47. 9	112. 5	38 28. 3	111. 5	10
3 00	37 29. 9	117. 4	38 12. 4	116. 5	38 54. 6	115. 6	39 36. 2	114. 7	40 17. 4	113. 7	3 00
2 50	39 13. 8	119. 7	39 57. 1	118. 8	40 40. 0	117. 9	41 22. 5	117. 0	42 04. 6	116. 0	2 50
40	40 55. 2	122. 1	41 39. 6	121. 2	42 23. 5	120. 3	43 06. 9	119. 3	43 49. 8	118. 4	40
30	42 34. 1	124. 6	43 19. 3	123. 7	44 04. 2	122. 8	44 48. 6	121. 9	45 32. 6	120. 9	30
20	44 09. 8	127. 2	44 56. 2	126. 3	45 42. 2	125. 4	46 27. 7	124. 5	47 12. 7	123. 5	20
10	45 42. 2	130. 0	46 29. 8	129. 1	47 16. 7	128. 2	48 03. 5	127. 3	48 49. 6	126. 3	10
2 00	47 10. 8	132. 9	47 59. 5	132. 0	48 47. 9	131. 1	49 35. 7	130. 2	50 23. 1	129. 2	2 00
1 50	48 35. 3	136. 0	49 25. 2	135. 1	50 14. 7	134. 2	51 03. 9	133. 3	51 52. 6	132. 4	1 50
40	49 55. 0	139. 2	50 46. 3	138. 4	51 37. 2	137. 5	52 27. 6	136. 6	53 17. 6	135. 7	40
30	51 09. 8	142. 6	52 02. 1	141. 8	52 54. 2	141. 0	53 46. 0	140. 1	54 37. 5	139. 2	30
20	52 18. 6	146. 1	53 12. 3	145. 4	54 05. 8	144. 6	54 58. 9	143. 8	55 51. 7	143. 0	20
10	53 21. 2	149. 8	54 16. 1	149. 2	55 10. 9	148. 5	56 05. 3	147. 8	56 59. 5	147. 0	10
1 00	54 17. 0	153. 8	55 13. 2	153. 2	56 09. 2	152. 5	57 04. 9	151. 9	58 00. 3	151. 2	1 00
0 50	55 05. 5	157. 9	56 02. 7	157. 3	56 59. 6	156. 8	57 56. 6	156. 2	58 53. 4	155. 6	0 50
40	55 46. 0	162. 1	56 44. 1	161. 7	57 42. 2	161. 2	58 40. 1	160. 7	59 37. 9	160. 2	40
30	56 18. 0	166. 5	57 16. 8	166. 1	58 15. 7	165. 8	59 14. 6	165. 4	60 13. 4	165. 0	30
20	56 41. 2	170. 9	57 40. 8	170. 7	58 40. 3	170. 4	59 39. 8	170. 2	60 39. 2	169. 9	20
10	56 55. 3	175. 4	57 55. 2	175. 3	58 55. 1	175. 2	59 54. 9	175. 1	60 54. 8	175. 0	10
0 00	57 0. 0	180. 0	58 0. 0	180. 0	59 0. 0	180. 0	60 0. 0	180. 0	61 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 17.8	73.7	0 55.6	72.9	6 40
30	0 19.3	77.6	0 56.7	76.8	1 34.3	76.0	2 11.6	75.2	2 49.0	74.4	30
20	2 15.0	79.1	2 52.1	78.3	3 29.2	77.5	4 06.3	76.7	4 43.3	75.9	20
10	4 11.5	80.6	4 48.2	79.8	5 25.0	79.0	6 01.7	78.2	6 38.3	77.4	10
6 00	6 08.2	82.1	6 44.7	81.3	7 21.2	80.5	7 57.6	79.7	8 33.9	78.9	6 00
5 50	8 05.5	83.6	8 41.8	82.8	9 18.1	82.0	9 54.2	81.2	10 30.2	80.4	5 50
40	10 03.1	85.1	10 39.3	84.3	11 15.3	83.5	11 51.2	82.7	12 26.9	81.9	40
30	12 01.0	86.6	12 37.0	85.8	13 12.9	85.0	13 48.7	84.2	14 24.1	83.3	30
20	13 59.1	88.1	14 35.0	87.3	15 10.8	86.5	15 46.4	85.7	16 21.8	84.8	20
10	15 57.3	89.6	16 33.1	88.8	17 08.9	88.0	17 44.2	87.2	18 19.6	86.3	10
5 00	17 55.5	91.2	18 31.4	90.4	19 07.0	89.5	19 42.4	88.7	20 17.6	87.8	5 00
4 50	19 53.6	92.8	20 29.5	91.9	21 05.3	91.0	21 40.7	90.2	22 15.8	89.3	4 50
40	21 51.5	94.4	22 27.6	93.5	23 03.3	92.6	23 38.8	91.8	24 13.9	90.9	40
30	23 49.2	96.0	24 25.4	95.1	25 01.4	94.2	25 36.9	93.3	26 12.1	92.4	30
20	25 46.7	97.6	26 23.1	96.7	26 59.1	95.8	27 34.8	94.9	28 10.1	94.0	20
10	27 43.5	99.3	28 20.2	98.4	28 56.6	97.5	29 32.3	96.6	30 07.9	95.6	10
4 00	29 39.9	101.0	30 16.8	100.1	30 53.4	99.2	31 29.5	98.3	32 05.3	97.3	4 00
3 50	31 35.6	102.8	32 12.8	101.9	32 49.8	101.0	33 26.3	100.0	34 02.3	99.0	3 50
40	33 30.3	104.7	34 08.1	103.7	34 45.4	102.8	35 22.3	101.8	35 58.7	100.8	40
30	35 24.2	106.6	36 02.5	105.6	36 40.3	104.7	37 17.7	103.7	37 54.5	102.7	30
20	37 16.9	108.5	37 55.8	107.6	38 34.1	106.6	39 12.0	105.6	39 49.3	104.6	20
10	39 08.4	110.6	39 47.8	109.6	40 26.9	108.7	41 05.1	107.6	41 43.2	106.6	10
3 00	40 58.1	112.8	41 38.3	111.8	42 18.0	110.8	42 57.2	109.7	43 35.8	108.7	3 00
2 50	42 46.2	115.1	43 27.3	114.0	44 07.8	113.0	44 47.8	111.9	45 27.1	110.9	2 50
40	44 32.3	117.4	45 14.2	116.3	45 55.5	115.3	46 36.3	114.3	47 16.6	113.2	40
30	46 16.1	119.9	46 59.0	118.8	47 41.4	117.8	48 23.1	116.7	49 04.4	115.6	30
20	47 57.2	122.5	48 41.2	121.5	49 24.6	120.4	50 07.4	119.3	50 49.7	118.2	20
10	49 35.3	125.3	50 20.4	124.3	51 05.1	123.2	51 49.1	122.1	52 32.8	121.0	10
2 00	51 10.0	128.3	51 56.4	127.3	52 42.2	126.2	53 27.5	125.1	54 12.2	124.0	2 00
1 50	52 40.8	131.4	53 28.5	130.4	54 15.7	129.4	55 02.4	128.3	55 48.4	127.1	1 50
40	54 07.2	134.8	54 56.3	133.8	55 44.8	132.7	56 32.9	131.7	57 20.4	130.5	40
30	55 28.4	138.3	56 19.0	137.3	57 09.1	136.3	57 58.7	135.3	58 47.8	134.2	30
20	56 44.1	142.1	57 36.2	141.2	58 27.8	140.2	59 19.0	139.2	60 09.7	138.2	20
10	57 53.4	146.2	58 46.9	145.3	59 40.1	144.4	60 32.9	143.4	61 25.2	142.4	10
1 00	58 55.6	150.4	59 50.6	149.6	60 45.2	148.8	61 39.5	147.9	62 33.5	147.0	1 00
0 50	59 49.9	154.9	60 46.1	154.2	61 42.4	153.5	62 38.1	152.7	63 33.8	151.8	0 50
40	60 35.5	159.6	61 33.1	159.0	62 30.4	158.4	63 27.6	157.7	64 24.6	157.0	40
30	61 12.2	164.5	62 10.6	164.1	63 09.0	163.6	64 07.5	163.1	65 05.7	162.5	30
20	61 38.6	169.6	62 37.9	169.3	63 37.1	168.9	64 36.3	168.6	65 35.5	168.2	20
10	61 54.6	174.8	62 54.5	174.7	63 54.3	174.5	64 54.1	174.3	65 53.9	174.1	10
0 00	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 26.1	66.0	7 00
6 50			0 19.8	69.8	0 58.1	69.0	1 36.3	68.3	2 14.7	67.5	6 50
40	1 33.5	72.1	2 11.3	71.3	2 49.1	70.5	3 26.8	69.8	4 04.5	69.0	40
30	3 26.4	73.6	4 03.8	72.8	4 40.9	72.0	5 18.3	71.2	5 55.4	70.4	30
20	5 20.2	75.1	5 57.1	74.3	6 33.9	73.5	7 10.6	72.7	7 47.3	71.9	20
10	7 14.8	76.6	7 51.1	75.8	8 27.5	75.0	9 03.9	74.2	9 40.2	73.4	10
6 00	9 10.1	78.1	9 46.2	77.3	10 22.2	76.5	10 58.1	75.6	11 33.8	74.8	6 00
5 50	11 06.1	79.6	11 41.8	78.7	12 17.5	77.9	12 52.9	77.0	13 28.2	76.2	5 50
40	13 02.6	81.1	13 38.0	80.2	14 13.3	79.4	14 48.4	78.5	15 23.4	77.7	40
30	14 59.6	82.5	15 34.8	81.6	16 09.8	80.8	16 44.5	79.9	17 19.1	79.1	30
20	16 56.9	84.0	17 31.9	83.1	18 06.7	82.3	18 41.2	81.4	19 15.5	80.5	20
10	18 54.7	85.4	19 29.5	84.6	20 03.9	83.7	20 38.3	82.8	21 12.2	81.9	10
5 00	20 52.6	86.9	21 27.2	86.1	22 01.6	85.2	22 35.8	84.3	23 09.6	83.4	5 00
4 50	22 50.7	88.4	23 25.2	87.6	23 59.5	86.7	24 33.5	85.7	25 07.2	84.8	4 50
40	24 48.8	90.0	25 23.3	89.1	25 57.5	88.2	26 31.4	87.2	27 05.0	86.3	40
30	26 47.0	91.5	27 21.5	90.6	27 55.8	89.7	28 29.5	88.7	29 03.0	87.8	30
20	28 45.1	93.1	29 19.7	92.2	29 53.9	91.2	30 27.8	90.3	31 01.2	89.3	20
10	30 43.1	94.7	31 17.7	93.8	31 52.1	92.8	32 25.9	91.8	32 59.3	90.8	10
4 00	32 40.6	96.4	33 15.5	95.4	33 50.0	94.4	34 24.0	93.4	34 57.5	92.4	4 00
3 50	34 37.9	98.1	35 13.1	97.1	35 47.8	96.1	36 21.9	95.1	36 55.6	94.1	3 50
40	36 34.7	99.8	37 10.1	98.8	37 45.0	97.8	38 19.5	96.8	38 53.3	95.7	40
30	38 30.8	101.6	39 06.8	100.6	39 41.9	99.6	40 16.7	98.5	40 50.7	97.4	30
20	40 26.2	103.5	41 02.4	102.5	41 38.1	101.4	42 13.2	100.3	42 47.7	99.2	20
10	42 20.7	105.5	42 57.4	104.5	43 33.7	103.4	44 09.1	102.2	44 44.1	101.1	10
3 00	44 13.8	107.6	44 51.2	106.5	45 28.1	105.4	46 04.2	104.2	46 39.6	103.1	3 00
2 50	46 05.9	109.8	46 44.0	108.6	47 21.4	107.5	47 58.2	106.3	48 34.2	105.1	2 50
40	47 56.2	112.1	48 35.1	110.9	49 13.3	109.7	49 50.9	108.5	50 27.8	107.3	40
30	49 44.9	114.5	50 24.8	113.3	51 03.8	112.1	51 42.2	110.9	52 19.9	109.6	30
20	51 31.3	117.1	52 12.1	115.9	52 52.3	114.7	53 31.7	113.4	54 10.4	112.1	20
10	53 15.2	119.8	53 57.4	118.6	54 38.6	117.4	55 19.1	116.1	55 58.7	114.8	10
2 00	54 56.2	122.8	55 39.5	121.6	56 22.1	120.3	57 03.9	119.0	57 44.9	117.6	2 00
1 50	56 33.7	126.0	57 18.6	124.8	58 02.5	123.5	58 45.8	122.1	59 27.9	120.7	1 50
40	58 07.3	129.4	58 53.5	128.2	59 39.0	126.9	60 23.9	125.6	61 07.9	124.2	40
30	59 36.2	133.1	60 24.1	131.9	61 11.2	130.6	61 57.9	129.3	62 43.5	127.9	30
20	60 59.9	137.1	61 49.4	135.9	62 38.3	134.6	63 26.6	133.3	64 14.2	131.9	20
10	62 17.0	141.3	63 08.5	140.2	63 59.2	139.0	64 49.5	137.8	65 39.0	136.4	10
1 00	63 27.1	146.0	64 20.2	144.9	65 12.9	143.8	66 05.1	142.6	66 56.9	141.3	1 00
0 50	64 29.0	150.9	65 23.9	150.0	66 18.5	149.0	67 12.8	147.9	68 06.2	146.7	0 50
40	65 21.5	156.3	66 18.0	155.5	67 14.3	154.6	68 10.4	153.6	69 06.1	152.6	40
30	66 03.8	161.9	67 01.8	161.3	67 59.7	160.6	68 57.1	159.8	69 54.5	159.0	30
20	66 34.6	167.9	67 33.6	167.5	68 32.7	166.9	69 31.6	166.3	70 30.5	165.7	20
10	66 53.6	173.9	67 53.4	173.6	68 53.1	173.4	69 52.8	173.1	70 52.5	172.8	10
0 00	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20									0 14.4	59.2	7 20
10					0 37.5	62.2	1 17.1	61.4	1 56.7	60.7	10
7 00	1 05.0	65.2	1 43.9	64.5	2 22.8	63.7	3 01.7	62.9	3 40.5	62.2	7 00
6 50	2 53.0	66.7	3 31.2	66.0	4 09.4	65.2	4 47.5	64.4	5 25.7	63.6	6 50
40	4 42.1	68.2	5 19.8	67.5	5 57.3	66.7	6 34.9	65.9	7 12.3	65.1	40
30	6 32.5	69.6	7 09.4	68.9	7 46.4	68.1	8 23.2	67.3	9 00.1	66.5	30
20	8 23.8	71.1	9 00.3	70.3	9 36.6	69.5	10 12.9	68.7	10 49.0	67.9	20
10	10 16.2	72.6	10 52.1	71.8	11 27.8	70.9	12 03.6	70.1	12 39.1	69.3	10
6 00	12 09.4	74.0	12 44.8	73.2	13 20.1	72.3	13 55.2	71.5	14 30.1	70.7	6 00
5 50	14 03.4	75.4	14 38.3	74.6	15 13.1	73.7	15 47.6	72.9	16 22.1	72.1	5 50
40	15 58.1	76.8	16 32.6	76.0	17 07.0	75.1	17 41.1	74.3	18 15.0	73.4	40
30	17 53.5	78.2	18 27.7	77.4	19 01.5	76.5	19 35.2	75.7	20 08.6	74.8	30
20	19 49.6	79.6	20 23.4	78.8	20 56.9	77.9	21 30.1	77.0	22 03.0	76.1	20
10	21 46.1	81.0	22 19.5	80.2	22 52.7	79.3	23 25.5	78.4	23 58.1	77.5	10
5 00	23 43.1	82.5	24 16.3	81.6	24 49.1	80.7	25 21.6	79.7	25 53.7	78.8	5 00
4 50	25 40.4	83.9	26 13.3	83.0	26 45.9	82.1	27 18.1	81.1	27 50.0	80.2	4 50
40	27 38.1	85.4	28 10.9	84.4	28 43.2	83.5	29 15.2	82.5	29 46.7	81.5	40
30	29 36.0	86.9	30 08.6	85.9	30 40.7	84.9	31 12.4	83.9	31 43.7	82.9	30
20	31 34.2	88.3	32 06.7	87.3	32 38.7	86.3	33 10.2	85.3	33 41.2	84.3	20
10	33 32.2	89.8	34 04.7	88.8	34 36.7	87.8	35 08.0	86.8	35 38.9	85.7	10
4 00	35 30.5	91.4	36 02.9	90.4	36 34.8	89.3	37 06.2	88.2	37 36.9	87.2	4 00
3 50	37 28.6	93.0	38 01.1	91.9	38 33.0	90.8	39 04.2	89.7	39 35.1	88.6	3 50
40	39 26.6	94.6	39 59.2	93.5	40 31.2	92.4	41 02.6	91.3	41 33.3	90.2	40
30	41 24.1	96.3	41 57.0	95.2	42 29.1	94.1	43 00.6	92.9	43 31.3	91.8	30
20	43 21.5	98.1	43 54.6	96.9	44 27.0	95.8	44 58.7	94.6	45 29.5	93.4	20
10	45 18.2	99.9	45 51.6	98.7	46 24.3	97.5	46 56.2	96.3	47 27.3	95.1	10
3 00	47 14.3	101.9	47 48.2	100.7	48 21.3	99.4	48 53.6	98.1	49 25.0	96.8	3 00
2 50	49 09.5	103.9	49 43.9	102.6	50 17.6	101.3	50 50.1	100.0	51 22.1	98.7	2 50
40	51 03.7	106.0	51 38.8	104.7	52 13.1	103.4	52 46.4	102.0	53 18.7	100.7	40
30	52 56.6	108.3	53 32.5	107.0	54 07.3	105.6	54 41.2	104.2	55 14.3	102.8	30
20	54 48.1	110.8	55 24.8	109.4	56 00.6	108.0	56 35.5	106.5	57 09.1	105.0	20
10	56 37.6	113.4	57 15.2	112.0	57 52.1	110.5	58 27.9	109.0	59 02.6	107.4	10
2 00	58 24.9	116.2	59 03.9	114.8	60 42.0	113.3	60 19.0	111.7	61 54.7	110.0	2 00
1 50	60 09.5	119.3	60 49.7	117.8	61 29.1	116.3	62 07.5	114.6	62 44.5	112.9	1 50
40	61 50.9	122.7	62 32.8	121.2	63 13.8	119.6	63 53.7	117.9	64 32.2	116.1	40
30	63 28.2	126.4	64 11.8	124.8	64 54.5	123.2	65 36.1	121.5	66 16.6	119.7	30
20	65 00.8	130.5	65 46.5	128.9	66 31.3	127.3	67 15.0	125.5	67 57.3	123.7	20
10	66 27.7	135.0	67 15.4	133.4	68 02.4	131.8	68 48.2	130.0	69 33.2	128.2	10
1 00	67 47.7	140.0	68 37.8	138.5	69 27.1	136.9	70 15.6	135.2	71 02.7	133.3	1 00
0 50	68 59.5	145.4	69 51.7	144.1	70 43.5	142.6	71 34.2	140.9	72 24.5	139.2	0 50
40	70 01.3	151.5	70 56.0	150.3	71 50.3	148.9	72 43.9	147.4	73 36.7	145.8	40
30	70 51.7	158.0	71 48.2	157.0	72 45.0	155.9	73 41.0	154.7	74 36.5	153.3	30
20	71 29.2	165.1	72 27.7	164.3	73 26.1	163.5	74 24.2	162.6	75 22.0	161.6	20
10	71 52.2	172.5	72 51.8	172.1	73 51.3	171.7	74 50.9	171.2	75 50.3	170.6	10
0 00	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	76 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

59° 42.0

60° 54.6

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 58.2	91.5	1 21.2	92.3	0 44.2	93.1	0 07.2	93.9			5 50
40	3 56.3	93.1	3 19.3	93.9	2 42.2	94.7	2 05.1	95.4	1 28.0	96.2	40
30	5 54.2	94.6	5 17.1	95.4	4 39.8	96.2	4 02.5	97.0	3 25.2	97.7	30
20	7 51.9	96.2	7 14.6	97.0	6 37.1	97.8	5 59.6	98.6	5 22.0	99.3	20
10	9 49.2	97.8	9 11.8	98.6	8 34.1	99.4	7 56.2	100.1	7 18.5	100.9	10
5 00	11 46.1	99.4	11 08.3	100.2	10 30.4	101.0	9 52.4	101.7	9 14.2	102.5	5 00
4 50	13 42.4	101.0	13 04.3	101.8	12 26.1	102.6	11 47.7	103.3	11 09.2	104.1	4 50
40	15 38.1	102.6	14 59.7	103.4	14 21.0	104.2	13 42.2	105.0	13 03.3	105.8	40
30	17 33.0	104.3	16 54.2	105.1	16 15.2	105.9	15 35.9	106.7	14 56.7	107.5	30
20	19 27.2	106.0	18 47.9	106.8	18 08.4	107.6	17 28.7	108.4	16 48.8	109.2	20
10	21 20.2	107.8	20 40.5	108.6	20 00.5	109.4	19 20.3	110.2	18 39.8	110.9	10
4 00	23 12.2	109.6	22 31.9	110.4	21 51.3	111.2	21 10.5	112.0	20 29.5	112.7	4 00
3 50	25 02.9	111.4	24 22.0	112.2	23 40.8	113.0	22 59.4	113.8	22 17.9	114.6	3 50
40	26 52.3	113.3	26 10.8	114.1	25 28.9	114.9	24 46.8	115.7	24 04.5	116.5	40
30	28 40.0	115.3	27 57.8	116.1	27 15.2	116.9	26 32.4	117.7	25 49.4	118.5	30
20	30 26.0	117.3	29 43.0	118.1	28 59.7	118.9	28 16.1	119.7	27 32.3	120.5	20
10	32 09.9	119.4	31 26.2	120.2	30 42.1	121.0	29 57.7	121.8	29 13.1	122.6	10
3 00	33 51.8	121.6	33 07.2	122.4	32 22.2	123.2	31 36.9	124.0	30 51.4	124.8	3 00
2 50	35 31.1	123.9	34 45.6	124.7	33 59.8	125.5	33 13.7	126.3	32 27.2	127.0	2 50
40	37 07.9	126.3	36 21.4	127.1	35 34.6	127.8	34 47.5	128.6	34 00.1	129.3	40
30	38 41.6	128.8	37 54.2	129.6	37 06.4	130.3	36 18.2	131.1	35 30.0	131.8	30
20	40 12.2	131.3	39 23.7	132.1	38 34.9	132.8	37 45.7	133.6	36 56.4	134.3	20
10	41 39.0	134.0	40 49.5	134.8	39 59.6	135.5	39 09.5	136.2	38 19.1	136.9	10
2 00	43 02.1	136.8	42 11.4	137.6	41 20.4	138.3	40 29.2	138.9	39 37.7	139.5	2 00
1 50	44 20.6	139.8	43 28.9	140.5	42 36.9	141.2	41 44.5	141.8	40 52.1	142.4	1 50
40	45 34.5	142.9	44 41.6	143.5	43 48.5	144.2	42 55.1	144.8	42 01.6	145.4	40
30	46 43.2	146.1	45 49.2	146.7	44 55.1	147.3	44 00.7	147.9	43 06.1	148.5	30
20	47 46.4	149.4	46 51.3	150.0	45 56.1	150.6	45 00.7	151.1	44 05.1	151.7	20
10	48 43.2	152.9	47 47.4	153.4	46 51.2	153.9	45 54.8	154.4	44 58.3	154.9	10
1 00	49 34.0	156.5	48 37.0	157.0	47 39.8	157.4	46 42.6	157.9	45 45.2	158.3	1 00
0 50	50 17.6	160.2	49 19.8	160.6	48 21.8	161.0	47 23.8	161.4	46 25.6	161.7	0 50
40	50 54.0	164.0	49 55.4	164.4	48 56.7	164.7	47 58.0	165.0	46 59.2	165.3	40
30	51 22.6	167.9	50 23.4	168.2	49 24.1	168.4	48 24.9	168.7	47 25.6	168.9	30
20	51 43.3	171.9	50 43.7	172.1	49 44.0	172.3	48 44.3	172.4	47 44.6	172.6	20
10	51 55.8	175.9	50 55.9	176.0	49 56.0	176.1	48 56.1	176.2	47 56.2	176.3	10
0 00	52 0.0	180.0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 50.8	97.0	0 13.7	97.8							5 40
30	2 47.9	98.5	2 10.4	99.3	1 43.1	100.1	0 55.6	100.9	0 18.1	101.7	30
20	4 44.4	100.1	4 06.7	100.9	3 29.0	101.7	2 51.3	102.5	2 13.5	103.2	20
10	6 40.7	101.7	6 02.6	102.5	5 24.5	103.2	4 46.4	104.0	4 08.2	104.8	10
5 00	8 36.0	103.3	7 57.6	104.1	7 19.2	104.8	6 40.7	105.6	6 02.1	106.4	5 00
4 50	10 30.7	104.9	9 51.9	105.7	9 13.0	106.5	8 34.1	107.2	7 55.0	108.0	4 50
40	12 24.3	106.6	11 45.1	107.3	11 05.8	108.1	10 26.4	108.9	9 46.9	109.6	40
30	14 17.2	108.3	13 37.5	109.0	12 57.6	109.8	12 17.7	110.6	11 37.6	111.3	30
20	16 08.8	110.0	15 28.6	110.7	14 48.3	111.5	14 07.8	112.3	13 27.1	113.0	20
10	17 59.4	111.7	17 18.5	112.5	16 37.5	113.2	15 56.5	114.0	15 15.1	114.7	10
4 00	19 48.3	113.5	19 06.9	114.3	18 25.4	115.0	17 43.6	115.8	17 01.7	116.5	4 00
3 50	21 36.1	115.4	20 53.9	116.1	20 11.6	116.9	19 29.2	117.6	18 46.6	118.4	3 50
40	23 22.0	117.3	21 39.2	118.0	21 56.3	118.8	20 13.1	119.5	19 29.7	120.3	40
30	25 06.2	119.2	24 22.6	120.0	23 38.8	120.8	22 54.9	121.5	22 10.7	122.2	30
20	26 48.3	121.2	26 03.9	122.0	25 19.4	122.8	24 34.6	123.5	23 49.6	124.2	20
10	28 28.2	123.3	27 43.0	124.1	26 57.6	125.9	26 12.1	125.6	25 26.2	126.3	10
3 00	30 05.7	125.5	29 19.6	126.2	28 33.4	127.0	27 46.9	127.7	27 00.2	128.4	3 00
2 50	31 40.6	127.8	30 53.6	128.5	30 06.3	129.2	29 19.0	129.9	28 31.4	130.6	2 50
40	33 12.5	130.1	32 24.6	130.8	31 36.5	131.5	30 48.2	132.2	29 59.6	132.9	40
30	34 41.4	132.5	33 52.6	133.2	33 03.4	133.9	32 14.2	134.6	31 24.6	135.2	30
20	36 06.8	135.0	35 17.0	135.7	34 26.9	136.3	33 36.6	137.0	32 46.1	137.6	20
10	37 28.5	137.6	36 37.6	138.3	35 46.5	138.9	34 55.3	139.5	34 03.7	140.2	10
2 00	38 46.1	140.2	37 54.2	140.9	37 02.1	141.6	36 09.9	142.2	35 17.4	142.8	2 00
1 50	39 59.4	143.1	39 06.6	143.7	38 13.4	144.3	37 20.2	144.9	36 26.7	145.5	1 50
40	41 07.9	146.0	40 14.0	146.6	39 20.0	147.2	38 25.8	147.7	37 31.4	148.3	40
30	42 11.4	149.0	41 16.5	149.6	40 21.5	150.1	39 26.4	150.6	38 31.1	151.1	30
20	43 09.5	152.2	42 13.7	152.7	41 17.7	153.2	40 21.7	153.6	39 25.5	154.1	20
10	44 01.8	155.4	43 05.0	155.8	42 08.2	156.3	41 11.3	156.7	40 14.4	157.1	10
1 00	44 47.8	158.7	43 50.3	159.1	42 52.7	159.5	41 55.1	159.9	40 57.4	160.2	1 00
0 50	45 27.6	162.1	44 29.2	162.4	43 31.0	162.8	42 32.6	163.1	41 34.3	163.4	0 50
40	46 00.4	165.6	45 01.6	165.9	44 02.7	166.1	43 03.8	166.4	42 04.8	166.6	40
30	46 26.3	169.1	45 26.9	169.3	44 27.5	169.5	43 28.2	169 7	42 28.8	169.9	30
20	46 45.0	172.7	45 45.3	172.9	44 45.6	173.0	43 45.9	173.1	42 46.1	173.3	20
10	46 56.3	176.3	45 56.3	176.4	44 56.4	176.5	43 56.5	176.6	42 56.5	176.6	10
0 00	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

22° 39.'2 21° 13.'0 20° 29.'6

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 35.7	104.0	0 57.9	104.8	0 20.1	105.5					5 20
10	3 30.2	105.6	2 51.7	106.4	2 13.6	107.1	1 35.1	107.9	0 56.9	108.7	10
5 00	5 23.5	107.2	4 44.8	107.9	4 06.0	108.7	3 27.2	109.5	2 48.4	110.2	5 00
4 50	7 16.0	108.8	6 36.7	109.5	5 57.4	110.3	5 18.1	111.1	4 38.7	111.8	4 50
40	9 07.2	110.4	8 27.5	111.1	7 47.7	111.9	7 07.8	112.7	6 27.8	113.4	40
30	10 57.4	112.1	10 17.1	112.8	9 36.7	113.6	8 56.1	114.3	8 15.6	115.0	30
20	12 46.3	113.8	12 05.4	114.5	11 24.3	115.3	10 43.2	116.0	10 01.9	116.7	20
10	14 33.8	115.5	13 52.2	116.2	13 10.5	117.0	12 28.6	117.7	11 46.7	118.4	10
4 00	16 19.6	117.3	15 37.3	118.0	14 54.9	118.8	14 12.4	119.5	13 29.7	120.2	4 00
3 50	18 03.8	119.1	17 20.8	119.8	16 37.6	120.6	15 54.4	121.3	15 10.7	122.0	3 50
40	19 46.1	121.0	19 02.3	121.7	18 18.4	122.5	17 34.3	123.2	16 50.1	123.9	40
30	21 26.4	122.9	20 41.9	123.6	19 57.1	124.4	19 12.2	125.1	18 27.1	125.8	30
20	23 04.4	124.9	22 19.1	125.6	21 33.5	126.3	20 47.8	127 0	20 01.9	127.7	20
10	24 40.2	127.0	23 53.9	127.7	23 07.5	128.4	22 20.8	129.0	21 34.1	129.7	10
3 00	26 13.2	129.1	25 26.1	129.8	24 38.8	130.5	23 51.3	131.1	23 03.6	131.8	3 00
2 50	27 43.6	131.2	26 55.5	131.9	26 07.3	132.6	25 18.9	133.3	24 30.4	133.9	2 50
40	29 10.8	133.5	28 21.9	134.2	27 32.7	134.8	26 43.4	135.5	25 53.9	136.1	40
30	30 34.9	135.9	29 45.0	136.5	28 54.8	137.1	28 04.6	137.8	27 14.1	138.4	30
20	31 55.4	138.3	31 40.5	138.9	30 13.4	139.5	29 22.2	140.1	28 30.8	140.7	20
10	33 12.2	140.8	32 20.3	141.4	31 28.2	142.0	30 36.1	142.5	29 44.0	143.1	10
2 00	34 24.8	143.4	33 32.0	143.9	32 39.0	144.5	31 45.9	145.0	30 52.7	145.6	2 00
1 50	35 33.2	146.0	34 39.4	146.6	33 45.4	147.1	32 51.5	147.6	31 57.3	148.1	1 50
40	36 36.9	148.8	35 42.2	149.3	34 47.4	149.8	33 52.5	150.3	32 57.5	150.8	40
30	37 35.6	151.6	36 40.1	152.1	35 44.4	152.5	34 48.6	153.0	33 52.8	153.5	30
20	38 29.2	154.5	37 32.8	155.0	36 36.3	155.4	35 39.8	155.8	34 43.1	156.2	20
10	39 17.3	157.5	38 20.1	157.9	37 22.8	158.3	36 25.6	158.6	35 28.2	159.0	10
1 00	39 59.5	160.6	39 01.6	160.9	38 03.7	161.2	37 05.7	161.6	36 07.7	161.9	1 00
0 50	40 35.8	163.7	39 37.4	164.0	38 38.8	164.3	37 40.2	164.6	36 41.7	164.8	0 50
40	41 05.8	166.9	40 06.8	167.1	39 07.7	167.4	38 08.6	167.6	37 09.6	167.8	40
30	41 29.5	170.1	40 30.0	170.3	39 30.5	170.5	38 31.1	170.7	37 31.6	170.8	30
20	41 46.4	173.4	40 46.6	173.5	39 46.8	173.6	38 47.0	173.7	37 47.3	173.9	20
10	41 56.6	176.7	40 56.6	176.8	39 56.6	176.8	38 56.8	176.8	37 56.8	176.9	10
0 00	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

31° 04.5

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 18.7	109.5									5 10
5 00	2 09.5	111.0	1 30.6	111.8	0 51.7	112.5	0 12.8	113.3			5 00
4 50	3 59.3	112.6	3 19.8	113.3	2 40.2	114.0	2 00.8	114.8	1 21.2	115.6	4 50
40	5 47.7	114.2	5 07.6	114.9	4 27.5	115.6	3 47.3	116.4	3 07.1	117.2	40
30	7 34.9	115.8	6 54.1	116.5	6 13.3	117.2	5 32.4	118.0	4 51.5	118.8	30
20	9 20.5	117.5	8 39.1	118.2	7 57.6	118.9	7 16.0	119.7	6 34.3	120.4	20
10	11 04.7	119.2	10 22.3	119.9	9 40.1	120.6	8 57.8	121.4	8 15.3	122.1	10
4 00	12 46.8	120.9	12 03.9	121.7	11 20.9	122.4	10 37.8	123.1	9 54.6	123.8	4 00
3 50	14 27.3	122.7	13 43.6	123.4	12 59.8	124.1	12 15.9	124.8	11 31.9	125.5	3 50
40	16 05.7	124.6	15 21.2	125.3	14 36.6	126.0	13 51.8	126.6	13 07.0	127.3	40
30	17 41.9	126.4	16 56.7	127.1	16 11.1	127.8	15 25.6	128.5	14 39.8	129.2	30
20	19 15.8	128.4	18 29.6	129.1	17 43.3	129.7	16 56.8	130.4	15 10.2	131.1	20
10	20 47.2	130.4	20 00.1	131.1	19 12.9	131.7	18 25.6	132.4	17 38.1	133.0	10
3 00	22 15.8	132.4	21 27.8	133.1	20 39.7	133.7	19 51.5	134.4	19 03.1	135.0	3 00
2 50	23 41.7	134.5	22 52.8	135.2	22 03.6	135.8	21 14.5	136.5	20 25.1	137.0	2 50
40	25 04.2	136.7	24 14.4	137.3	23 24.5	137.9	22 34.4	138.6	21 44.1	139.1	40
30	26 23.7	139.0	25 32.8	139.6	24 41.9	140.2	23 50.9	140.8	22 59.8	141.3	30
20	27 39.3	141.3	26 47.6	141.9	25 55.8	142.4	25 03.9	143.0	24 11.9	143.5	20
10	28 51.4	143.7	27 58.8	144.2	27 06.1	144.7	26 13.1	145.3	25 20.3	145.8	10
2 00	29 59.4	146.1	29 05.9	146.6	28 12.3	147.1	27 18.6	147.6	26 24.7	148.1	2 00
1 50	31 03.1	148.6	30 08.8	149.1	29 14.2	149.6	28 19.7	150.1	27 24.9	150.6	1 50
40	32 02.3	151.2	31 07.1	151.7	30 11.8	152.1	29 16.4	152.6	28 21.0	153.0	40
30	32 56.9	153.9	32 00.8	154.3	31 04.7	154.7	30 08.6	155.1	29 12.3	155.5	30
20	33 46.4	156.6	32 49.6	157.0	31 52.8	157.4	30 55.8	157.7	29 58.8	158.1	20
10	34 30.8	159.3	33 33.2	159.6	32 35.8	160.0	31 38.1	160.4	30 40.5	160.7	10
1 00	35 09.6	162.2	34 11.5	162.5	33 13.4	162.8	32 15.2	163.1	31 17.0	163.4	1 00
0 50	35 43.0	165.1	34 44.1	165.3	33 45.6	165.6	32 46.9	165.8	31 48.1	166.1	0 50
40	36 10.4	168.0	35 11.3	168.2	34 12.2	168.4	33 13.0	168.6	32 13.8	168.8	40
30	36 32.0	171.0	35 32.5	171.1	34 33.1	171.3	33 33.5	171.4	32 33.9	171.6	30
20	36 47.5	174.0	35 47.7	174.1	34 47.9	174.2	33 48.2	174.3	32 48.4	174.4	20
10	36 56.9	177.0	35 56.9	177.0	34 57.0	177.1	34 57.1	177.1	32 57.2	177.2	10
0 00	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 41.6	116.3	0 02.1	117.1							4 50
40	2 26.8	117.9	1 46.5	118.6	1 06.2	119.4	0 25.9	120.1			40
30	4 10.5	119.5	3 29.5	120.2	2 48.4	121.0	2 07.3	121.7	1 26.2	122.4	30
20	5 52.6	121.1	5 10.8	121.8	4 28.9	122.6	3 47.0	123.3	3 05.1	124.0	20
10	7 32.8	122.8	6 50.2	123.5	6 07.6	124.2	5 24.8	124.9	4 42.2	125.6	10
4 00	9 11.3	124.5	8 27.9	125.2	7 44.4	125.9	7 00.9	126.6	6 17.3	127.3	4 00
3 50	10 47.7	126.2	10 03.5	126.9	9 19.2	127.6	8 34.7	128.3	7 50.3	129.0	3 50
40	12 22.0	128.0	11 36.9	128.7	10 51.7	129.4	10 06.5	130.0	9 21.1	130.7	40
30	13 53.9	129.8	13 08.0	130.5	12 21.9	131.2	11 35.8	131.8	10 49.6	132.5	30
20	15 23.5	131.7	14 36.7	132.4	13 49.7	133.0	13 02.7	133.6	12 15.5	134.3	20
10	16 50.4	133.6	16 02.7	134.3	15 14.8	134.9	14 26.8	135.5	13 38.8	136.1	10
3 00	18 14.6	135.6	17 26.0	136.2	16 37.0	136.8	15 48.3	137.4	14 59.3	138.0	3 00
2 50	19 35.7	137.6	18 46.2	138.2	17 56.6	138.8	17 06.7	139.4	16 16.9	140.0	2 50
40	20 53.8	139.7	20 03.4	140.3	19 12.8	140.9	18 22.1	141.5	17 31.3	142.0	40
30	22 08.5	141.9	21 17.2	142.4	20 25.6	143.0	19 34.0	143.5	18 42.4	144.1	30
20	23 19.8	144.1	22 27.5	144.6	21 35.1	145.1	20 42.6	145.6	19 50.0	146.2	20
10	24 27.2	146.3	23 34.0	146.8	22 40.7	147.3	21 47.3	147.8	20 54.0	148.3	10
2 00	25 39.8	148.6	24 36.8	149.1	23 42.7	149.6	22 48.5	150.0	21 54.2	150.5	2 00
1 50	26 30.2	151.0	25 35.3	151.5	24 40.3	151.9	23 45.3	152.3	22 50.3	152.8	1 50
40	27 25.4	153.4	26 29.7	153.8	25 34.0	154.3	24 38.2	154.7	23 42.3	155.1	40
30	28 15.9	155.9	27 19.5	156.3	26 23.0	156.7	25 26.4	157.1	24 29.9	157.4	30
20	29 01.8	158.4	28 04.7	158.8	27 07.6	159.1	26 10.4	159.5	25 13.1	159.8	20
10	29 42.8	161.0	28 45.0	161.3	27 47.2	161.6	26 49.4	161.9	25 51.6	162.2	10
1 00	30 18.7	163.6	29 20.4	163.9	28 22.0	164.2	27 23.6	164.4	26 25.2	164.7	1 00
0 50	30 49.3	166.3	29 50.5	166.5	28 51.6	166.8	27 52.7	167.0	26 53.9	167.2	0 50
40	31 14.6	160.0	30 15.4	169.2	29 16.1	169.4	28 16.9	169.5	27 17.6	169.7	40
30	31 34.4	171.7	30 34.8	171.9	29 35.2	172.0	28 35.7	172.1	27 36.1	172.3	30
20	31 48.6	174.5	30 48.8	174.6	29 49.0	174.7	28 49.1	174.8	27 49.3	174.8	20
10	31 57.2	177.2	30 57.2	177.3	29 57.2	177.3	28 57.2	177.4	27 57.4	177.4	10
0 00	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10									0 34.8	85.3	6 10
6 00	0 00.0	90.0	0 37.8	89.2	1 15.5	88.5	1 53.3	87.7	2 31.0	86.9	6 00
5 50	1 56.5	91.6	2 34.5	90.8	3 12.1	90.0	3 49.8	89.2	4 27.4	88.4	5 50
40	3 53.0	93.2	4 30.8	92.4	5 08.7	91.6	5 46.4	90.8	6 24.0	90.0	40
30	5 49.4	94.7	6 27.3	93.9	7 05.1	93.2	7 42.9	92.4	8 20.6	91.6	30
20	7 45.4	96.3	8 23.4	95.5	9 01.4	94.8	9 39.2	94.0	10 17.0	93.2	20
10	9 41.0	97.9	10 19.3	97.1	10 57.4	96.4	11 35.4	95.6	12 13.4	94.8	10
5 00	11 36.2	99.6	12 14.7	98.8	12 53.1	98.0	13 31.3	97.2	14 09.3	96.4	5 00
4 50	13 30.8	101.2	14 09.7	100.4	14 48.2	99.6	15 26.8	98.8	16 05.0	98.0	4 50
40	15 24.9	102.9	16 03.9	102.1	16 42.9	101.3	17 21.6	100.5	18 00.2	99.7	40
30	17 18.0	104.6	17 57.6	103.8	18 36.9	103.0	19 15.9	102.2	19 54.8	101.4	30
20	19 10.4	106.4	19 50.4	105.6	20 30.0	104.8	21 09.5	104.0	21 48.7	103.2	20
10	21 01.8	108.2	21 42.1	107.4	22 22.2	106.5	23 02.1	105.7	23 41.8	104.9	10
4 00	22 52.0	110.0	23 32.8	109.2	24 13.4	108.4	24 53.8	107.6	25 33.9	106.7	4 00
3 50	24 40.8	111.9	25 22.3	111.1	26 03.5	110.3	26 44.4	109.5	27 24.9	108.6	3 50
40	26 28.3	113.8	27 10.3	113.0	27 52.1	112.2	28 33.6	111.4	29 14.8	110.5	40
30	28 14.1	115.8	28 56.9	115.0	29 39.3	114.2	30 21.5	113.4	31 03.3	112.5	30
20	29 58.1	117.8	30 41.6	117.0	31 24.8	116.2	32 07.6	115.4	32 50.1	114.6	20
10	31 40.2	120.0	32 24.5	119.2	33 08.3	118.3	33 52.0	117.5	34 35.2	116.7	10
3 00	33 20.1	122.2	34 05.1	121.4	34 49.9	120.6	35 34.2	119.8	36 18.3	118.9	3 00
2 50	34 57.4	124.5	35 43.4	123.7	36 29.1	122.9	37 14.2	122.1	37 59.3	121.2	2 50
40	36 32.1	126.9	37 19.0	126.1	38 05.5	125.3	38 51.7	124.5	39 37.6	123.6	40
30	38 03.8	129.4	38 51.8	128.6	39 39.2	127.8	40 26.3	127.0	41 13.2	126.1	30
20	39 32.3	132.0	40 21.2	131.2	41 09.7	130.4	41 57.9	129.6	42 45.7	128.8	20
10	40 57.1	134.7	41 47.1	133.9	42 36.6	133.1	43 25.9	132.4	44 14.8	131.6	10
2 00	42 18.1	137.5	43 09.0	136.8	43 59.6	136.0	44 50.0	135.2	45 40.0	134.5	2 00
1 50	43 34.6	140.4	44 26.7	139.7	45 18.4	139.0	46 09.8	138.3	47 01.0	137.5	1 50
40	44 46.5	143.5	45 39.6	142.8	46 32.5	142.1	47 25.0	141.4	48 17.3	140.7	40
30	45 53.2	146.7	46 47.6	146.0	47 41.4	145.4	48 35.1	144.7	49 28.6	144.0	30
20	46 54.6	150.0	47 49.8	149.4	48 44.8	148.8	49 39.6	148.2	50 34.2	147.5	20
10	47 49.8	153.4	48 46.1	152.9	49 42.2	152.3	50 38.0	151.8	51 33.8	151.1	10
1 00	48 38.9	156.9	49 36.0	156.5	50 33.0	156.0	51 29.9	155.5	52 26.5	154.9	1 00
0 50	49 21.1	160.6	50 19.1	160.2	51 17.0	159.8	52 14.6	159.4	53 12.1	158.9	0 50
40	49 56.2	164.4	50 54.9	164.0	51 53.5	163.7	52 52.0	163.3	53 50.4	162.9	40
30	50 23.9	168.2	51 23.2	167.9	52 22.4	167.7	53 21.5	167.4	54 20.6	167.1	30
20	50 43.9	172.1	51 43.6	171.9	52 43.2	171.7	53 42.8	171.6	54 42.4	171.4	20
10	50 56.0	176.1	51 55.9	175.9	52 55.8	175.8	53 55.7	175.7	54 55.6	175.6	10
0 00	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20					0 32.5	81.4	1 10.5	80.7	1 48.5	79.9	6 20
10	1 12.6	84.5	1 50.3	83.8	2 28.1	83.0	3 05.8	82.2	3 43.5	81.4	10
6 00	3 08.7	86.1	3 46.3	85.3	4 24.0	84.6	5 01.5	83.8	5 39.0	83.0	6 00
5 50	5 05.1	87.7	5 42.7	86.9	6 20.1	86.1	6 57.5	85.3	7 34.9	84.5	5 50
40	7 01.6	89.2	7 39.1	88.5	8 16.5	87.7	8 53.8	86.9	9 31.0	86.1	40
30	8 58.3	90.8	9 35.7	90.0	10 13.0	89.2	10 50.3	88.4	11 27.4	87.6	30
20	10 54.7	92.4	11 32.2	91.6	12 09.6	90.8	12 46.8	90..0	13 24.0	89.2	20
10	12 51.1	94.0	13 28.7	93.2	14 06.1	92.4	14 43.4	91.6	15 20.5	90.8	10
5 00	14 47.2	95.6	15 25.0	94.8	16 02.6	94.0	16 39.9	93.2	17 17.1	92.4	5 00
4 50	16 43.1	97.2	17 21.1	96.4	17 58.6	95.6	18 36.1	94.8	19 13.4	94.0	4 50
40	18 38.5	98.9	19 16.6	98.1	19 54.6	97.3	20 32.2	96.4	21 09.6	95.6	40
30	20 33.3	100.6	21 11.8	99.8	21 49.9	99.0	22 27.8	98.1	23 05.4	97.3	30
20	22 27.6	102.3	23 06.4	101.5	23 44.9	100.7	24 23.0	99.8	25 00.9	99.0	20
10	24 21.1	104.1	25 00.2	103.3	25 38.9	102.4	26 17.5	101.6	26 55.7	100.7	10
4 00	26 13.7	105.9	26 53.2	105.1	27 32.5	104.2	28 11.4	103.4	28 49.9	102.5	4 00
3 50	28 05.2	107.8	28 45.3	106.9	29 24.9	106.1	30 04.3	105.2	30 43.2	104.3	3 50
40	29 55.6	109.7	30 36.2	108.8	31 16.4	108.0	31 56.3	107.1	32 35.8	106.2	40
30	31 44.8	111.7	32 25.9	110.8	33 06.7	109.9	33 47.1	109.1	34 27.2	108.2	30
20	33 32.3	113.7	34 14.1	112.9	34 55.6	112.0	35 36.6	111.1	36 17.2	110.2	20
10	35 18.2	115.9	36 00.7	115.0	36 42.8	114.1	37 24.6	113.2	38 05.9	112.3	10
3 00	37 02.0	118.1	37 45.3	117.2	38 28.3	116.3	39 10.9	115.4	39 52.9	114.5	3 00
2 50	38 43.8	120.4	39 28.0	119.2	40 11.6	118.6	40 55.1	117.7	41 38.0	116.8	2 50
40	40 23.0	122.8	41 08.2	121.9	41 52.9	121.0	42 37.2	120.1	43 20.9	119.2	40
30	41 59.6	125.3	42 45.8	124.5	43 31.4	123.6	44 16.6	122.7	45 01.5	121.8	30
20	43 33.2	128.0	44 20.3	127.1	45 07.1	126.2	45 53.4	125.3	46 39.2	124.4	20
10	45 03.2	130.8	45 51.6	129.9	46 39.3	129.0	47 26.8	128.1	48 13.7	127.2	10
2 00	46 29.7	133.7	47 19.1	132.8	48 08.1	132.0	48 56.6	131.1	49 44.8	130.2	2 00
1 50	47 51.9	136.7	48 42.5	135.9	49 32.5	135.1	50 22.3	134.2	51 11.7	133.3	1 50
40	49 09.4	139.9	50 01.2	139.2	50 52.6	138.3	51 43.7	137.5	52 34.3	136.6	40
30	50 21.9	143.3	51 14.9	142.6	52 07.3	141.8	52 59.7	141.0	53 51.7	140.2	30
20	51 28.6	146.8	52 22.7	146.1	53 16.7	145.4	54 10.3	144.7	55 03.5	143.9	20
10	52 29.2	150.5	53 24.5	149.9	54 19.5	149.2	55 14.4	148.5	56 09.0	147.8	10
1 00	53 23.1	154.4	54 19.6	153.8	55 15.9	153.2	56 11.9	152.6	57 07.6	151.9	1 00
0 50	54 09.9	158.4	55 07.5	157.9	56 04.5	157.4	57 01.6	156.8	57 58.5	156.2	0 50
40	54 48.8	162.4	55 47.1	162.1	56 45.4	161.7	57 43.5	161.2	58 41.4	160.7	40
30	55 19.6	166.8	56 18.6	166.5	57 17.5	166.2	58 16.5	165.8	59 15.4	165.4	30
20	55 42.0	171.1	56 41.6	170.9	57 41.2	170.7	58 40.7	170.4	59 40.1	170.2	20
10	55 55.5	175.5	56 55.4	175.4	57 55.3	175.3	58 55.1	175.2	59 55.0	175.1	10
0 00	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 34.7	73.7	1 13.3	72.9	6 40
30	0 32.3	77.6	1 10.5	76.8	1 48.8	76.0	2 27.0	75.2	3 05.1	74.4	30
20	2 26.4	79.1	3 04.4	78.3	3 42.3	77.6	4 20.1	76.8	4 57.9	76.0	20
10	4 21.3	80.6	4 58.8	79.9	5 36.4	79.1	6 13.9	78.3	6 51.4	77.5	10
6 00	6 16.4	82.2	6 53.8	81.4	7 31.1	80.6	8 08.3	79.8	8 45.4	79.0	6 00
5 50	8 12.1	83.7	8 49.3	82.9	9 26.4	82.1	10 03.3	81.3	10 40.1	80.5	5 50
40	10 08.2	85.3	10 45.2	84.5	11 22.0	83.7	11 58.8	82.9	12 35.3	82.1	40
30	12 04.5	86.8	12 41.3	86.0	13 18.1	85.2	13 54.7	84.4	14 31.0	83.6	30
20	14 00.9	88.4	14 37.7	87.6	15 14.3	86.8	15 50.8	85.9	16 27.1	85.1	20
10	15 57.5	89.6	16 34.2	89.1	17 10.9	88.3	17 47.2	87.4	18 23.3	86.6	10
5 00	17 54.1	91.5	18 30.8	90.7	19 07.3	89.9	19 43.6	89.0	20 19.7	88.2	5 00
4 50	19 50.5	93.1	20 27.3	92.3	21 03.9	91.5	21 40.3	90.6	22 16.3	89.7	4 50
40	21 46.8	94.8	22 23.7	93.9	23 00.3	93.1	23 36.7	92.2	24 12.8	91.3	40
30	23 42.9	96.4	24 19.9	95.6	24 56.7	94.7	25 33.1	93.8	26 09.4	93.0	30
20	25 38.5	98.1	26 15.8	97.3	26 52.7	96.4	27 29.4	95.5	28 05.6	94.7	20
10	27 33.6	99.8	28 11.1	99.0	28 48.3	98.1	29 25.2	97.2	30 01.8	96.3	10
4 00	29 28.1	101.6	30 06.0	100.7	30 43.5	99.8	31 20.6	98.9	31 57.3	97.9	4 00
3 50	31 21.9	103.4	32 00.2	102.5	32 38.1	101.6	33 15.6	100.7	33 52.6	99.7	3 50
40	33 14.9	105.3	33 53.6	104.4	34 31.9	103.4	35 09.7	102.5	35 47.1	101.5	40
30	35 06.9	107.3	35 46.0	106.3	36 24.7	105.4	37 03.2	104.4	37 41.0	103.4	30
20	36 57.5	109.3	37 37.3	108.3	38 16.6	107.4	38 55.4	106.4	39 33.8	105.4	20
10	38 46.8	111.4	39 27.4	110.4	40 07.3	109.5	40 46.8	108.4	41 25.7	107.4	10
3 00	40 34.5	113.5	41 15.7	112.6	41 56.4	111.6	42 36.5	110.6	43 16.2	109.6	3 00
2 50	42 20.5	115.8	43 02.5	114.9	43 44.0	113.9	44 25.0	112.9	45 05.2	111.9	2 50
40	44 04.4	118.2	44 47.2	117.3	45 29.5	116.3	46 11.3	115.2	46 52.6	114.2	40
30	45 45.8	120.8	46 29.6	119.8	47 13.0	118.8	47 55.8	117.7	48 37.9	116.7	30
20	47 24.6	123.4	48 09.5	122.4	48 53.8	121.4	49 37.6	120.4	50 20.9	119.3	20
10	49 00.3	126.2	49 46.2	125.2	50 31.8	124.2	51 16.8	123.2	52 01.1	122.1	10
2 00	50 32.5	129.2	51 19.7	128.2	52 06.4	127.2	52 52.6	126.2	53 38.2	125.1	2 00
1 50	52 00.7	132.4	52 49.2	131.4	53 37.2	130.4	54 24.9	129.4	55 11.5	128.3	1 50
40	53 24.5	135.7	54 14.4	134.8	55 03.7	133.8	55 52.6	132.8	56 41.0	131.7	49
30	54 43.3	139.3	55 34.6	138.3	56 25.4	137.4	57 15.7	136.4	58 05.5	135.4	30
20	55 56.4	143.1	56 49.1	142.2	57 41.3	141.3	58 33.2	140.3	59 24.6	139.3	20
10	57 03.4	147.0	57 57.4	146.2	58 51.0	145.3	59 44.5	144.4	60 37.2	143.5	10
1 00	58 03.3	151.2	58 58.6	150.5	59 53.6	149.7	60 48.4	148.9	61 42.9	148.0	1 00
0 50	58 55.4	155.6	59 52.0	155.0	60 48.4	154.3	61 44.7	153.6	62 40.5	152.8	0 50
40	59 39.2	160.2	60 37.0	159.7	61 34.5	159.1	62 32.0	158.5	63 29.2	157.8	40
30	60 14.1	165.0	61 12.9	164.6	62 11.3	164.1	63 10.0	163.6	64 08.4	163.1	30
20	60 39.6	169.9	61 38.9	169.6	62 38.2	169.3	63 37.5	169.0	64 36.8	168.6	20
10	60 54.8	174.9	61 54.7	174.8	62 54.5	174.6	63 54.4	174.5	64 54.2	174.3	10
0 00	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00							1 10.9	66.7	0 50.6	66.9	7 00
6 50	0 01.4	70.5	0 40.5	69.8	1 19.7	69.1	1 58.7	68.3	2 37.7	67.5	6 50
40	1 51.9	72.1	2 30.5	71.4	3 09.0	70.6	3 47.6	69.8	4 26.0	69.1	40
30	3 43.3	73.7	4 21.4	72.9	4 59.4	72.1	5 37.4	71.3	6 15.4	70.6	30
20	5 35.7	75.2	6 13.3	74.4	6 50.9	73.6	7 28.4	72.8	8 05.8	72.1	20
10	7 28.7	76.7	8 05.9	75.9	8 43.1	75.1	9 20.2	74.3	9 57.2	73.6	10
6 00	9 22.4	78.2	9 59.3	77.4	10 36.1	76.6	11 12.9	75.8	11 49.4	75.0	6 00
5 50	11 16.9	79.7	11 53.4	78.9	12 29.9	78.1	13 06.2	77.3	13 42.4	76.5	5 50
40	13 11.8	81.3	13 46.1	80.4	14 24.2	79.6	15 00.2	78.8	15 36.1	78.0	40
30	15 07.2	82.8	15 43.3	81.9	16 19.1	81.1	16 54.8	80.2	17 30.4	79.4	30
20	17 03.1	84.3	17 38.9	83.4	18 14.6	82.6	18 50.0	81.7	19 25.2	80.9	20
10	18 59.2	85.8	19 34.9	84.9	20 10.4	84.1	20 45.6	83.2	21 20.6	82.3	10
5 00	20 55.6	87.3	21 31.2	86.5	22 06.5	85.6	22 41.5	84.7	23 16.3	83.8	5 00
4 50	22 52.1	88.9	23 27.7	88.0	24 02.8	87.1	24 37.8	86.2	25 12.3	85.3	4 50
40	24 48.6	90.4	25 24.1	89.5	25 59.2	88.6	26 34.1	87.7	27 08.6	86.8	40
30	26 45.1	92.0	27 20.7	91.1	27 55.8	90.2	28 30.6	89.3	29 05.1	88.3	30
20	28 41.6	93.7	29 17.1	92.7	29 52.4	91.8	30 27.2	90.9	31 01.6	89.9	20
10	30 37.8	95.3	31 13.6	94.4	31 48.8	93.4	32 23.7	92.5	32 58.1	91.5	10
4 00	32 33.6	97.0	33 09.6	96.1	33 45.1	95.1	34 20.1	94.1	34 54.6	93.1	4 00
3 50	34 29.1	98.7	35 05.4	97.8	35 41.2	96.8	36 16.2	95.8	36 50.9	94.8	3 50
40	36 24.1	100.6	37 00.5	99.6	37 36.5	98.6	38 12.0	97.5	38 47.0	96.5	40
30	38 18.4	102.4	38 55.2	101.4	39 31.5	100.4	40 07.4	99.3	40 42.6	98.3	30
20	40 11.7	104.4	40 49.0	103.3	41 25.8	102.3	42 02.0	101.2	42 37.6	100.1	20
10	42 04.3	106.4	42 42.0	105.3	43 19.4	104.3	43 56.0	103.2	44 32.1	102.1	10
3 00	43 55.3	108.5	44 33.8	107.4	45 11.7	106.3	45 48.8	105.2	46 25.5	104.1	3 00
2 50	45 45.1	110.8	46 24.4	109.7	47 02.8	108.5	47 41.0	107.4	48 18.1	106.2	2 50
40	47 33.2	113.1	48 13.3	112.0	48 52.6	110.8	49 31.3	109.7	50 09.4	108.4	40
30	49 19.5	115.6	50 00.5	114.4	50 40.8	113.2	51 20.2	112.1	51 59.1	110.8	30
20	51 03.5	118.2	51 45.4	117.0	52 26.7	115.8	53 07.3	114.6	53 47.2	113.4	20
10	52 44.9	121.0	53 27.9	119.8	54 10.4	118.6	54 52.0	117.4	55 33.0	116.1	10
2 00	54 23.3	124.0	55 07.6	122.8	55 51.3	121.6	56 34.2	120.3	57 16.4	119.0	2 00
1 50	55 58.0	127.2	56 43.9	126.0	57 28.8	124.8	58 13.1	123.5	58 56.7	122.2	1 50
40	57 28.8	130.6	58 16.0	129.4	59 02.5	128.2	59 48.4	127.0	60 33.6	125.6	40
30	58 54.9	134.3	59 44.0	133.1	60 31.9	131.9	61 19.2	130.7	62 06.0	129.4	30
20	60 15.6	138.2	61 05.9	137.1	61 55.7	135.9	62 44.9	134.8	63 33.5	133.5	20
10	61 29.9	142.5	62 22.0	141.5	63 13.5	140.3	64 04.7	139.2	64 55.0	137.9	10
1 00	62 37.1	147.0	63 30.8	146.1	64 24.1	145.0	65 17.1	143.9	66 09.5	142.7	1 00
0 50	63 36.2	152.0	64 31.8	151.1	65 26.8	150.1	66 21.4	149.1	67 15.7	148.0	0 50
40	64 26.4	157.1	65 23.2	156.4	66 19.9	155.6	67 16.3	154.7	68 12.5	153.7	40
30	65 06.7	162.6	66 04.9	162.0	67 02.8	161.4	68 00.8	160.7	68 58.2	159.9	30
20	65 36.0	168.2	66 35.1	167.8	67 34.2	167.4	68 33.3	166.9	69 32.3	166.3	20
10	65 54.0	174.1	66 53.8	173.9	67 53.5	173.7	68 53.3	173.4	69 53.0	173.1	10
0 00	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20							0 04.2	59.9	0 45.2	59.2	7 20
10			0 25.3	63.0	1 05.6	62.2	1 45.8	61.4	2 26.1	60.7	10
7 00	1 30.2	65.2	2 09.8	64.5	2 49.4	63.7	3 29.0	63.0	4 08.5	62.2	7 00
6 50	3 16.7	66.7	3 55.7	66.0	4 34.6	65.2	5 13.5	64.5	5 52.3	63.7	6 50
40	5 04.4	68.3	5 42.8	67.5	6 21.1	66.7	6 59.4	66.0	7 37.5	65.2	40
30	6 53.2	69.8	7 31.1	69.0	8 08.7	68.2	8 46.4	67.4	9 23.9	66.6	30
20	8 43.1	71.3	9 20.4	70.5	9 57.6	69.7	10 34.6	68.9	11 11.5	68.1	20
10	10 34.0	72.8	11 10.8	71.9	11 47.4	71.1	12 23.8	70.3	13 00.2	69.5	10
6 00	12 25.8	74.2	13 02.1	73.4	13 38.2	72.6	14 14.1	71.8	14 49.8	70.9	6 00
5 50	14 18.3	75.6	14 54.2	74.8	15 29.7	74.0	16 05.2	73.2	16 40.4	72.3	5 50
40	16 11.7	77.1	16 47.0	76.3	17 22.3	75.4	17 57.2	74.6	18 32.0	73.7	40
30	18 05.6	78.5	18 40.6	77.7	19 15.8	76.8	19 49.9	76.0	20 23.7	75.1	30
20	20 00.2	80.0	20 34.9	79.2	21 09.3	78.3	21 43.4	77.4	22 17.2	76.5	20
10	21 55.2	81.4	22 29.6	80.6	23 03.6	79.7	23 37.4	78.8	24 10.8	77.9	10
5 00	23 50.7	82.9	24 24.8	82.0	24 58.6	81.1	25 32.1	80.2	26 05.2	79.3	5 00
4 50	25 46.5	84.4	26 20.4	83.5	26 53.9	82.5	27 27.1	81.6	27 59.9	80.7	4 50
40	27 42.7	85.9	28 16.4	84.9	28 49.7	84.0	29 22.8	83.0	29 55.3	82.1	40
30	29 39.0	87.4	30 12.7	86.4	30 45.7	85.5	31 18.5	84.5	31 50.8	83.5	30
20	31 35.6	88.9	32 09.1	87.9	32 42.2	87.0	33 14.8	86.0	33 46.8	85.0	20
10	33 32.2	90.5	34 05.6	89.5	34 38.6	88.5	35 11.1	87.5	35 43.0	86.4	10
4 00	35 28.7	92.1	36 02.2	91.1	36 35.1	90.0	37 07.7	89.0	37 39.5	87.9	4 00
3 50	37 25.1	93.7	37 58.7	92.7	38 31.6	91.6	39 04.2	90.6	39 36.0	89.5	3 50
40	39 21.3	95.4	39 55.0	94.4	40 28.2	93 3	41 00.8	92.2	41 32.6	91.1	40
30	41 17.1	97.2	41 51.2	96.1	42 24.5	95.0	42 57.1	93.8	43 29.1	92.7	30
20	43 12.5	99.0	43 46.8	97.9	44 20.4	96.7	44 53.4	95.6	45 25.4	94.4	20
10	45 07.4	100.9	45 42.0	99.8	46 16.0	98.6	46 49.2	97.4	47 21.6	96.2	10
3 00	47 01.4	102.9	47 36.5	101.7	48 10.9	100.5	46 44.5	99.2	49 17.2	98.0	3 00
2 50	48 54.5	105.0	49 30.2	103.8	50 05.1	102.5	50 39.2	101.2	51 12.4	100.0	2 50
40	50 46.5	107.2	51 22.9	106.0	51 58.5	104.7	52 33.2	103.3	53 06.9	102.0	40
30	52 37.0	109.6	53 14.2	108.3	53 50.6	107.0	54 25.9	105.6	55 00.2	104.2	30
20	54 26.1	112.1	55 04.2	110.8	55 41.3	109.4	56 17.7	107.9	56 52.8	106.5	20
10	56 13.1	114.8	56 52.2	113.4	57 30.4	112.0	58 07.1	110.5	58 43.9	109.0	10
2 00	57 57.7	117.7	58 38.0	116.3	59 17.5	114.8	59 56.0	113.3	60 33.2	111.8	2 00
1 50	59 39.5	120.8	60 21.2	119.4	61 01.9	117.9	61 41.6	116.3	62 20.2	114.7	1 50
40	61 17.8	124.2	62 01.0	122.7	62 43.4	121.2	63 24.8	119.6	64 04.9	118.0	40
30	62 51.7	128.0	63 37.0	126.5	64 21.0	125.0	65 04.0	123.3	65 45.8	121.6	30
20	64 21.2	132.1	65 08.1	130.6	65 54.2	129.0	66 39.3	127.4	67 23.2	125.7	20
10	65 44.7	136.5	66 33.6	135.1	67 21.7	133.5	68 09.0	131.9	68 55.0	130.2	10
1 00	67 01.2	141.5	67 52.3	140.1	68 42.6	138.6	69 32.2	137.0	70 20.7	135.3	1 00
0 50	68 09.5	146.9	69 02.7	145.6	69 55.2	144.2	70 47.2	142.7	71 38.5	141.1	0 50
40	69 08.3	152.7	70 03.5	151.6	70 58.4	150.4	71 52.8	149.1	72 46.5	147.6	40
30	69 55.9	159.1	70 53.0	158.2	71 49.7	157.2	72 46.5	156.1	73 42.5	154.8	30
20	70 31.1	165.8	71 29.8	165.2	72 08.4	164.4	73 26.7	163.7	74 24.9	162.8	20
10	70 52.7	172.8	71 52.3	172.5	72 52.0	172.1	73 51.5	171.7	74 51.1	171.2	10
0 00	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

48° 44.5

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 56.5	91.6	1 18.9	92.4	0 40.9	93.1	0 03.2	93.9			5 50
40	3 53.0	93.2	3 15.2	93.9	2 37.3	94.7	1 59.4	95.5	1 21.4	96.3	40
30	5 49.4	94.7	5 11.3	95.5	4 33.2	96.3	3 55.2	97.1	3 17.1	97.8	30
20	7 45.4	96.3	7 07.2	97.1	6 28.9	97.9	5 50.7	98.7	5 12.3	99.4	20
10	9 41.0	97.9	9 02.7	98.7	8 24.1	99.5	7 45.7	100.3	7 07.1	101.0	10
5 00	11 36.2	99.6	10 57.6	100.4	10 18.9	101.1	9 40.1	101.9	9 01.1	102.7	5 00
4 50	13 30.8	101.2	12 52.0	102.0	12 12.9	102.8	11 33.8	103.6	10 54.5	104.4	4 50
40	15 24.9	102.9	14 45.6	103.7	14 06.2	104.5	13 26.6	105.2	12 46.9	106.0	40
30	17 18.0	104.6	16 38.4	105.4	15 58.7	106.2	15 18.7	106.9	14 38.5	107.7	30
20	19 10.4	106.4	18 30.4	107.1	17 50.1	107.9	17 09.7	108.7	16 29.0	109.5	20
10	21 01.8	108.2	20 21.2	108.9	19 40.3	109.7	18 59.4	110.5	18 18.3	111.3	10
4 00	22 52.0	110.0	22 10.9	110.7	21 29.5	111.5	20 48.0	112.3	20 06.2	113.1	4 00
3 50	24 40.8	111.9	23 59.2	112.6	23 17.2	113.4	22 35.1	114.2	21 52.7	115.0	3 50
40	26 28.3	113.8	25 46.1	114.6	25 03.5	115.4	24 20.6	116.1	23 37.6	116.9	40
30	28 14.1	115.8	27 31.1	116.6	26 47.8	117.4	26 04.4	118.1	25 20.7	118.9	30
20	29 58.1	117.8	29 14.5	118.6	28 30.4	119.4	27 46.2	120.2	27 01.7	120.9	20
10	31 40.2	120.0	30 55.7	120.8	30 10.9	121.5	29 25.9	122.3	28 40.6	123.0	10
3 00	33 20.1	122.2	33 34.9	123.0	32 49.1	123.7	31 03.2	124.5	30 17.0	125.2	3 00
2 50	34 57.4	124.5	34 11.2	125.3	33 24.8	126.0	32 37.9	126.8	31 51.0	127.5	2 50
40	36 32.1	126.9	35 45.1	127.6	34 57.6	128.4	34 09.9	129.1	33 21.9	129.8	40
30	38 03.8	129.4	37 15.8	130.1	36 27.3	130.9	35 38.7	131.6	34 49.8	132.3	30
20	39 32.3	132.0	38 43.2	132.7	37 53.9	133.4	37 04.2	134.1	36 14.3	134.8	20
10	40 57.1	134.7	40 07.1	135.4	39 16.6	136.1	38 26.0	136.8	37 35.1	137.5	10
2 00	42 18.1	137.5	41 26.9	138.2	40 35.4	138.8	39 43.7	139.5	38 51.8	140.2	2 00
1 50	43 34.6	140.4	42 42.4	141.1	41 49.9	141.7	40 57.2	142.3	40 04.4	143.0	1 50
40	44 46.5	143.5	43 53.2	144.1	42 59.7	144.7	42 06.0	145.3	41 12.1	145.9	40
30	45 53.2	146.7	44 59.0	147.2	44 04.4	147.8	43 09.7	148.4	42 14.9	149.0	30
20	46 54.6	150.0	45 59.2	150.5	45 03.7	151.1	44 08.1	151.6	43 12.3	152.1	20
10	47 49.8	153.4	46 53.6	153.9	45 57.1	154.4	45 00.5	154.9	44 03.9	155.3	10
1 00	48 38.9	156.9	47 41.7	157.4	46 44.3	157.8	45 46.9	158.3	44 49.4	158.7	1 00
0 50	49 21.1	160.6	48 23.1	161.0	47 25.0	161.4	46 26.8	161.8	45 28.7	162.1	0 50
40	49 56.2	164.4	48 57.6	164.7	47 58.8	165.0	47 00.0	165.3	46 01.2	165.6	40
30	50 23.9	168.2	49 24.7	168.4	48 25.4	168.7	47 26.0	168.9	46 26.8	169.1	30
20	50 43.9	172.1	49 44.3	172.3	48 44.6	172.4	47 44.8	172.6	46 45.1	172.7	20
10	50 56.0	176.1	49 56.0	176.2	48 56.1	176.2	47 56.2	176.3	46 56.3	176.3	10
0 00	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 43.5	97.0	0 05.5	97.8							5 40
30	2 38.9	98.6	2 00.7	99.4	1 22.5	100.2	0 44.3	100.9	0 06.0	101.7	30
20	4 33.9	100.2	3 55.4	101.0	3 16.9	101.7	2 38.4	102.5	1 59.8	103.3	20
10	6 28.3	101.8	5 49.5	102.6	5 10.8	103.3	4 31.9	104.1	3 52.9	104.9	10
5 00	8 22.1	103.4	7 43.0	104.2	7 03.8	105.0	6 24.5	105.7	5 45.2	106.5	5 00
4 50	10 15.1	105.1	9 35.6	105.8	8 55.9	106.6	8 16.2	107.4	7 36.4	108.1	4 50
40	12 07.1	106.8	11 27.2	107.5	10 47.1	108.3	10 06.9	109.1	9 26.7	109.8	40
30	13 58.2	108.5	13 17.8	109.2	12 37.3	110.0	11 56.6	110.8	11 15.7	111.5	30
20	15 48.3	110.2	15 07.3	111.0	14 26.2	111.7	13 45.0	112.5	13 03.6	113.2	20
10	17 37.0	112.0	16 55.4	112.8	16 13.8	113.5	15 31.9	114.3	14 49.9	115.0	10
4 00	19 24.3	113.8	18 42.2	114.6	18 00.0	115.3	17 17.4	116.1	16 34.8	116.8	4 00
3 50	21 10.1	115.7	20 27.4	116.5	19 44.4	117.2	19 01.3	118.0	18 17.9	118.7	3 50
40	22 54.4	117.6	22 10.9	118.4	21 27.2	119.1	20 43.4	119.9	19 59.3	120.6	40
30	24 36.7	119.6	23 52.4	120.4	23 08.0	121.1	22 23.4	121.8	21 38.6	122.5	30
20	26 17.0	121.7	25 31.9	122.4	24 46.8	123.1	24 01.4	123.8	23 15.8	124.5	20
10	27 55.1	123.8	27 09.2	124.5	26 23.2	125.2	25 37.1	125.9	24 50.6	126.6	10
3 00	29 30.7	126.0	28 44.0	126.7	27 57.1	127.4	27 10.1	128.1	26 22.8	128.8	3 00
2 50	31 03.6	128.2	30 16.1	128.9	29 28.3	129.6	28 40.4	130.3	27 52.2	131.0	2 50
40	32 33.8	130.6	31 45.3	131.3	30 56.6	131.9	30 07.8	132.6	29 18.7	133.3	40
30	34 00.7	133.0	33 11.3	133.7	32 21.7	134.3	31 31.8	135.0	30 42.0	135.7	30
20	35 24.2	135.5	34 33.9	136.2	33 43.3	136.8	32 52.6	137.4	32 01.6	138.1	20
10	36 43.9	138.1	35 52.7	138.8	35 01.2	139.4	34 09.5	140.0	33 17.6	140.6	10
2 00	37 59.8	140.8	37 07.5	141.4	36 15.0	142.0	35 22.4	142.6	34 29.5	143.2	2 00
1 50	39 11.2	143.6	38 18.0	144.2	37 24.5	144.8	36 30.9	145.3	35 37.2	145.9	1 50
40	40 18.1	146.5	39 23.8	147.1	38 29.5	147.6	37 35.0	148.1	36 40.3	148.6	40
30	41 19.9	149.5	40 24.8	150.0	39 29.4	150.5	38 34.0	151.0	37 38.4	151.5	30
20	42 16.4	152.6	41 20.4	153.1	40 24.2	153.5	39 27.9	154.0	38 31.5	154.4	20
10	43 07.2	155.8	42 10.2	156.2	41 13.3	156.6	40 16.2	157.0	39 19.1	157.4	10
1 00	43 51.9	159.1	42 54.2	159.4	41 56.5	159.8	40 58.8	160.2	40 00.9	160.5	1 00
0 50	44 30.4	162.4	43 32.0	162.7	42 33.7	163.0	41 35.3	163.4	40 36.7	163.7	0 50
40	45 02.3	165.8	44 03.4	166.1	43 04.5	166.3	42 05.5	166.6	41 06.4	166.9	40
30	45 27.4	169.3	44 27.9	169.5	43 28.6	169.7	42 29.2	169.9	41 29.8	170.1	30
20	45 45.5	172.9	44 45.8	173.0	43 46.0	173.1	42 46.3	173.3	41 46.5	173.4	20
10	45 56.3	176.4	44 56.4	176.5	43 56.5	176.5	42 56.6	176.6	41 56.6	176.7	10
0 00	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 21.2	104.1	0 42.6	104.8	0 04.0	105.5					5 20
10	3 13.9	105.7	2 34.9	106.4	1 55.9	107.2	1 16.8	107.9	0 37.8	108.7	10
5 00	5 05.7	107.3	4 26.3	108.0	3 46.7	108.8	3 07.2	109.5	2 27.6	110.3	5 00
4 50	6 56.5	108.9	6 16.5	109.6	5 36.6	110.4	4 56.6	111.1	4 16.4	111.9	4 50
40	8 56.2	110.6	8 05.8	111.3	7 25.2	112.1	6 44.6	112.8	6 03.9	113.5	40
30	10 34.9	112.3	9 53.7	113.0	9 12.6	113.8	8 31.4	114.5	7 50.1	115.2	30
20	12 22.0	114.0	11 40.4	114.7	10 58.6	115.5	10 16.6	116.2	9 34.8	116.9	20
10	14 07.8	115.8	13 25.4	116.5	12 43.1	117.2	12 00.6	117.9	11 18.0	118.6	10
4 00	15 52.0	117.6	15 09.0	118.3	14 25.9	119.0	13 42.8	119.7	12 59.4	120.4	4 00
3 50	17 34.4	119.4	16 50.8	120.1	16 07.0	120.8	15 23.1	121.5	14 39.0	122.2	3 50
40	19 15.1	121.3	18 30.6	122.0	17 46.1	122.7	17 01.4	123.4	16 16.6	124.1	40
30	20 53.7	123.3	20 08.4	123.9	19 23.1	124.6	18 37.7	125.3	17 52.1	126.0	30
20	22 30.0	125.3	21 44.0	125.9	20 57.8	126.6	20 11.6	127.3	19 25.1	128.0	20
10	24 03.9	127.4	23 17.2	128.0	22 30.1	128.7	21 42.9	129.4	20 55.7	130.0	10
3 00	25 35.3	129.5	24 47.6	130.1	23 59.8	130.8	23 11.7	131.5	22 23.5	132.1	3 00
2 50	27 03.8	131.7	26 15.3	132.3	25 26.6	133.0	24 37.8	133.6	23 48.6	134.2	2 50
40	28 29.4	133.9	27 40.0	134.6	26 50.3	135.2	26 00.5	135.8	25 10.5	136.4	40
30	29 51.7	136.3	29 01.3	136.9	28 10.8	137.5	27 20.1	138.1	26 29.2	138.7	30
20	31 10.5	138.7	30 19.2	139.3	29 27.7	139.9	28 36.1	140.5	27 44.3	141.1	20
10	32 25.5	141.2	31 33.2	141.8	30 40.9	142.4	39 48.3	142.9	28 55.8	143.5	10
2 00	33 36.5	143.8	32 43.4	144.3	31 50.1	144.9	30 56.7	145.4	30 03.1	145.9	2 00
1 50	34 43.2	146.4	33 49.2	146.9	32 55.0	147.5	32 00.8	148.0	31 06.4	148.5	1 50
40	35 45.5	149.1	34 50.5	149.6	33 55.5	150.1	33 00.3	150.6	32 05.1	151.1	40
30	36 42.7	152.0	35 47.0	152.4	34 51.2	152.9	33 55.1	153.3	32 59.1	153.7	30
20	37 35.0	154.9	36 38.4	155.3	35 41.7	155.7	34 45.0	156.1	33 48.1	156.5	20
10	38 21.7	157.8	37 24.5	158.2	36 27.1	158.6	35 29.7	158.9	34 32.1	159.3	10
1 00	39 02.9	160.8	38 04.9	161.2	37 06.9	161.5	36 08.8	161.8	35 10.6	162.1	1 00
0 50	39 38.2	163.9	38 39.6	164.2	37 41.0	164.5	36 42.4	164.8	35 43.7	165.0	0 50
40	40 07.4	167.1	39 08.3	167.3	38 09.1	167.5	37 10.0	167.8	36 10.9	168.0	40
30	40 30.4	170.3	39 30.8	170.4	38 31.3	170.6	37 31.9	170.8	36 32.4	170.9	30
20	40 46.8	173.5	39 47.0	173.6	38 47.2	173.7	37 47.4	173.8	36 47.6	173.9	10
10	40 56.7	176.7	39 56.7	176.8	38 56.9	176.8	37 56.8	176.9	36 56.9	177.0	10
0 00	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 48.0	111.0	1 08.4	111.8	0 28.8	112.5					5 00
4 50	3 36.2	112.6	2 56.0	113.4	2 15.8	114.1	1 35.6	114.9	0 55.2	115.6	4 50
40	5 23.1	114.2	4 42.3	115.0	4 01.5	115.7	3 20.6	116.5	2 39.7	117.2	40
30	7 08.7	115.9	6 27.3	116.7	5 45.8	117.4	5 04.1	118.1	4 22.6	118.8	30
20	8 52.8	117.6	8 10.7	118.4	7 28.5	119.1	6 46.3	119.8	6 03.9	120.5	20
10	10 35.2	119.3	9 52.5	120.1	9 09.6	120.8	8 26.5	121.5	7 43.4	122.2	10
4 00	12 15.9	121.1	11 32.3	121.8	10 48.7	122.5	10 05.0	123.2	9 21.2	123.9	4 00
3 50	13 54.8	122.9	13 10.6	123.6	12 26.1	124.3	11 41.6	125.0	10 56.8	125.7	3 50
40	15 31.6	124.8	14 46.5	125.5	14 01.3	126.2	13 15.9	126.8	12 30.6	127.5	40
30	17 06.1	126.7	16 20.2	127.4	15 34.3	128.1	14 48.1	128.7	14 01.8	129.3	30
20	18 38.5	128.7	17 51.7	129.3	17 04.9	130.0	16 17.9	130.6	15 30.7	131.2	20
10	20 08.2	130.7	19 20.7	131.3	18 32.9	132.0	17 45.1	132.6	16 57.1	133.2	10
3 00	21 35.2	132.7	20 46.8	133.4	19 58.2	134.0	19 09.5	134.6	18 20.6	135.2	3 00
2 50	22 59.4	134.8	22 10.1	135.5	21 20.6	136.1	20 31.1	136.7	19 41.2	137.3	2 50
40	24 20.4	137.0	23 30.2	137.6	22 39.8	138.2	21 49.3	138.8	20 58.6	139.4	40
30	25 38.2	139.3	24 47.1	139.9	23 55.8	140.4	23 04.6	141.0	22 12.9	141.6	30
20	26 52.4	141.6	26 00.4	142.2	25 08.2	142.7	24 16.0	143.3	23 23.6	143.8	20
10	28 02.9	144.0	27 10.0	144.5	26 16.9	145.0	25 23.8	145.6	24 30.6	146.1	10
2 00	29 09.5	146.4	28 15.7	146.9	27 21.9	147.4	26 27.9	147.9	25 33.7	148.4	2 00
1 50	30 11.8	148.9	29 17.1	149.4	28 22.4	149.9	27 27.7	150.3	26 32.7	150.8	1 50
40	31 09.7	151.5	30 14.2	152.0	29 18.7	152.4	28 23.1	152.8	27 27.5	153.2	40
30	32 02.9	154.1	31 06.9	154.5	30 10.5	154.9	29 14.1	155.3	28 17.6	155.7	30
20	32 51.3	156.8	31 54.3	157.2	30 57.4	157.6	30 00.3	157.9	29 03.1	158.3	20
10	33 34.6	159.6	32 37.0	159.9	31 39.2	160.3	30 41.6	160.6	29 43.8	160.9	10
1 00	34 12.4	162.4	33 14.2	162.7	32 16.0	163.0	31 17.7	163.3	30 19.4	163.5	1 00
0 50	34 44.9	165.3	33 46.2	165.5	32 47.5	165.7	31 48.7	166.0	30 49.8	166.2	0 50
40	35 11.7	168.2	34 12.5	168.4	33 13.4	168.6	32 14.2	168.7	31 14.9	168.9	40
30	35 32.8	171.1	34 33.4	171.2	33 33.8	171.4	32 34.1	171.5	31 34.5	171.7	30
20	35 47.8	174.0	34 48.0	174.1	33 48.2	174.2	32 48.5	174.3	31 48.7	174.4	20
10	35 56.9	177.0	34 57.1	177.1	33 57.1	177.1	32 57.1	177.2	31 57.2	177.2	10
0 00	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 15.0	116.3									4 50
40	1 58.7	117.9	1 17.8	118.7	0 36.8	119.4					40
30	3 40.9	119.5	2 59.2	120.3	2 17.5	121.0	1 35.8	121.7	0 54.1	122.4	30
20	5 21.6	121.2	4 39.1	121.9	3 56.6	122.6	3 14.1	123.3	2 31.5	124.0	20
10	7 00.3	122.9	6 17.1	123.6	5 33.8	124.3	4 50.6	125.0	4 07.2	125.7	10
4 00	8 37.3	124.6	7 53.3	125.3	7 09.2	126.0	6 25.1	126.7	5 40.9	127.4	4 00
3 50	10 12.2	126.4	9 27.4	127.0	8 42.4	127.7	7 57.6	128.4	7 12.6	129.1	3 50
40	11 45.0	128.2	10 59.4	128.8	10 13.6	129.5	9 27.8	130.2	8 41.9	130.8	40
30	13 15.4	130.0	12 29.0	130.6	11 42.4	131.3	10 55.7	132.0	10 09.1	132.6	30
20	14 43.5	131.9	13 56.2	132.5	13 08.7	133.2	12 21.2	133.8	11 33.6	134.4	20
10	16 08.9	133.8	15 20.7	134.4	14 32.4	135.1	13 44.1	135.7	12 55.6	136.3	10
3 00	17 31.6	135.8	16 42.6	136.4	15 53.3	137.0	15 04.0	137.6	14 14.6	138.2	3 00
2 50	18 51.3	137.9	18 01.3	138 5	17 11.2	139.0	16 21.2	139.6	15 30.8	140.2	2 50
40	20 07.9	140.0	19 17.1	140.5	18 26.2	141.1	17 35.1	141.6	16 44.0	142.2	40
30	21 21.2	142.1	20 29.4	142.6	19 37.6	143.2	18 45.7	143.7	17 53.7	144.2	30
20	22 31.1	144.3	21 38.5	144.8	20 45.8	145.3	19 53.0	145.9	19 00.1	146.4	20
10	23 37.2	146.6	22 43.7	147.1	21 50.1	157.5	20 56.6	148.0	20 02.9	148.5	10
2 00	24 39.5	148.9	23 45.3	149.4	22 50.9	149.8	21 56.4	150.3	21 01.9	150.7	2 00
1 50	25 37.7	151.3	24 42.7	151.7	23 47.4	152.1	22 52.2	152.6	21 56.9	153.0	1 50
40	26 31.7	153.7	25 35.8	154.1	24 39.9	154.5	23 43.9	154.9	22 47.9	155.3	40
30	27 21.1	156.1	26 24.6	156.5	25 27.9	156.9	24 31.2	157.2	23 34.6	157.6	30
20	28 05.9	158.6	27 08.7	159.0	26 11.4	159.3	25 14.1	159.6	24 16.7	160.0	20
10	28 46.1	161.2	27 48.1	161.5	26 50.2	161.8	25 52.4	162.1	24 54.5	162.4	10
1 00	29 21.1	163.8	28 22.7	164.1	27 24.2	164.3	26 25.8	164.6	25 27.3	164.8	1 00
0 50	29 51.0	166.4	28 52.1	166.7	27 53.2	166.9	26 54.3	167.1	25 55.4	167.3	0 50
40	30 15.7	169.1	29 16.5	169.5	28 17.2	169.5	27 17.9	169.6	26 18.6	169.8	40
30	30 35.0	171.8	29 35.4	172.0	28 35.8	172.1	27 36.2	172.2	26 36.6	172.4	30
20	30 48.9	174.5	29 49.1	174.6	28 49.3	174.7	27 49.4	174.8	26 49.6	174.9	20
10	30 57.2	177.3	29 57.2	177.3	28 57.3	177.4	27 57.4	177.4	26 57.4	177.4	10
0 00	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 00.9	86.1	0 39.6	85.3	6 10
6 00	0 00.0	90.0	0 38.6	89.2	1 17.1	88.5	1 55.7	87.7	2 34.2	86.9	6 00
5 50	1 55.0	91.6	2 33.5	90.8	3 12.1	90.1	3 50.6	89.3	4 29.1	88.5	5 50
40	3 49.7	93.2	4 28.3	92.5	5 06.9	91.7	5 45.5	90.9	6 23.9	90.1	40
30	5 44.3	94.8	6 23.1	94.1	7 01.7	93.3	7 40.3	92.5	8 18.8	91.7	30
20	7 38.6	96.5	8 17.5	95.7	8 56.3	94.9	9 35.0	94.2	10 13.6	93.4	20
10	9 32.6	98.1	10 11.7	97.3	10 50.7	96.5	11 29.6	95.8	12 08.6	95.0	10
5 00	11 26.1	99.8	12 05.4	99.0	12 44.6	98.2	13 23.6	97.5	14 02.5	96.7	5 00
4 50	13 19.0	101.5	13 58.8	100.7	14 38.0	99.9	15 17.4	99.1	15 56.4	98.3	4 50
40	15 11.3	103.2	15 51.2	102.4	16 31.0	101.6	17 10.5	100.8	17 49.9	100.0	40
30	17 02.8	104.9	17 43.0	104.1	18 23.1	103.4	19 03.0	102.6	19 42.8	101.8	30
20	18 53.4	106.7	19 34.1	105.9	20 14.5	105.1	20 54.8	104.3	21 34.8	103.5	20
10	20 42.9	108.5	21 24.0	107.7	22 04.9	106.9	22 45.8	106.1	23 26.1	105.3	10
4 00	22 31.3	110.4	23 12.9	109.6	23 54.3	108.8	24 35.5	108.0	25 16.4	107.2	4 00
3 50	24 18.2	112.3	25 00.5	111.5	25 42.5	110.7	26 24.2	109.9	27 05.6	109.1	3 50
40	26 03.9	114.2	26 46.7	113.5	27 29.2	112.7	28 11.5	111.9	28 53.5	111.0	40
30	27 47.8	116.2	28 31.2	115.5	29 14.5	114.7	29 57.4	113.9	30 40.0	113.1	30
20	29 29.0	118.3	30 14.1	117.6	30 58.0	116.8	31 41.6	116.0	32 24.9	115.2	20
10	31 10.0	120.5	31 55.0	119.7	32 39.7	118.9	33 24.0	118.1	34 08.0	117.3	10
3 00	32 47.9	122.7	33 33.6	122.0	34 19.1	121.2	35 04.2	120.4	35 49.0	119.6	3 00
2 50	34 23.2	125.1	35 09.8	124.3	35 56.2	123.5	36 42.2	122.7	37 27.8	121.9	2 50
40	35 55.9	127.5	36 43.4	126.7	37 30.6	125.9	38 17.5	125.1	39 04.0	124.3	40
30	37 25.5	130.0	38 14.0	128.2	39 02.2	128.5	39 50.0	127.7	40 37.5	126.9	30
20	38 52.0	132.6	39 41.4	131.8	40 30.5	131.1	41 19.3	130.3	42 07.8	129.5	20
10	40 14.7	135.3	41 05.1	134.5	41 55.3	133.8	42 45.2	133.1	43 34.8	132.3	10
2 00	41 33.6	138.1	42 25.0	137.4	43 16.2	136.7	44 07.1	135.9	44 57.7	135.2	2 00
1 50	42 48.1	141.0	43 40.7	140.3	44 32.9	139.6	45 24.8	138.9	46 16.6	138.2	1 50
40	43 58.2	144.0	44 51.7	143.4	45 44.9	142.8	46 37.9	142.1	47 30.7	141.4	40
30	45 03.0	147.2	45 57.5	146.6	46 51.9	146.0	47 45.9	145.4	48 39.9	144.7	30
20	46 02.5	150.5	46 58.0	149.9	47 53.3	149.3	48 48.5	148.7	49 43.4	148.1	20
10	46 56.0	153.9	47 52.6	153.4	48 49.0	152.8	49 45.0	152.3	50 41.0	151.8	10
1 00	47 43.6	157.4	48 40.9	156.9	49 38.1	156.5	50 35.2	156.0	51 32.1	155.5	1 00
0 50	48 24.5	161.0	49 22.5	160.6	50 20.5	160.2	51 18.4	159.8	52 16.2	159.4	0 50
40	48 58.4	164.7	49 57.1	164.4	50 55.8	164.0	51 54.4	163.7	52 53.0	163.3	40
30	49 25.2	168.4	50 24.5	168.2	51 23.8	167.9	52 22.8	167.7	53 22.0	167.4	30
20	49 44.5	172.2	50 44.2	172.1	51.43.8	171.9	52 43.5	171.7	53 43.1	171.6	20
10	49 56.1	176.1	50 56.0	176.0	51 55.9	176.0	52 55.9	175.9	53 55.8	175.8	10
0 00	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 06.2	78.4	6 30
20			0 02.7	82.2	0 41.5	81.4	1 20.2	80.7	1 59.0	79.9	20
10	1 18.2	84.6	1 56.8	83.8	2 35.4	83.0	3 13.9	82.3	3 52.4	81.5	10
6 00	3 12.7	86.2	3 51.2	85.4	4 29.6	84.6	5 08.0	83.9	5 46.3	83.1	6 00
5 50	5 07.6	87.8	5 45.9	87.0	6 24.2	86.2	7 02.4	85.5	7 40.5	84.7	5 50
40	7 02.3	89.4	7 40.6	88.6	8 18.9	87.8	8 57.0	87.0	9 35.0	86.3	40
30	8 57.2	91.0	9 35.6	90.2	10 13.8	89.4	10 51.8	88.6	11 29.9	87.8	30
20	10 52.1	92.6	11 30.4	91.8	12 08.6	91.0	12 46.7	90.2	13 24.7	89.4	20
10	12 46.8	94.2	13 25.2	93.4	14 03.5	92.6	14 41.6	91.8	15 19.6	91.0	10
5 00	14 41.2	95.9	15 19.8	95.1	15 58.2	94.3	16 36.4	93.5	17 14.4	92.7	5 00
4 50	16 35.4	97.5	17 14.1	96.7	17 52.7	95.9	18 31.0	95.1	19 09.1	94.3	4 50
40	18 29.1	99.2	19 08.0	98.4	19 46.8	97.6	20 25.3	96.8	21 03.6	96.0	40
30	20 22.2	101.0	21 01.4	100.2	21 40.4	99.3	22 19.1	98.5	22 57.6	97.7	30
20	22 14.6	102.7	22 54.2	101.9	23 33.6	101.1	24 12.6	100.3	24 51.3	99.4	20
10	24 06.2	104.5	24 46.2	103.7	25 25.9	102.9	26 05.2	102.1	26 44.3	101.3	10
4 00	25 57.0	106.4	26 37.4	105.6	27 17.5	104.7	27 57.3	103.9	28 36.7	103.0	4 00
3 50	27 46.8	108.3	28 27.7	107.5	29 08.2	106.6	29 48.2	105.8	30 28.2	104.9	3 50
40	29 35.2	110.2	30 16.6	109.4	30 57.7	108.5	31 38.4	107.7	32 18.8	106.8	40
30	31 22.3	112.2	32 04.3	111.4	32 46.0	110.5	33 27.2	109.7	34 08.2	108.8	30
20	33 07.9	114.3	33 50.5	113.5	34 32.8	112.6	35 14.7	111.7	35 56.2	110.8	20
10	34 51.8	116.5	35 35.1	115.7	36 18.0	114.8	37 00.6	113.9	37 42.7	113.0	10
3 00	36 33.5	118.7	37 17.6	117.9	38 01.4	117.0	38 44.8	116.1	39 27.7	115.2	3 00
2 50	38 13.1	121.1	38 58.2	120.2	39 42.7	119.4	40 26.8	118.5	41 10.5	117.6	2 50
40	39 50.2	123.5	40 36.1	122.6	41 21.6	121.8	42 06.7	120.9	42 51.3	120.0	40
30	41 24.7	126.1	42 11.4	125.2	42 57.9	124.4	43 43.9	123.5	44 29.5	122.6	30
20	42 55.9	128.7	43 43.8	127.9	44 31.3	127.0	45 18.3	126.1	46 04.9	125.2	20
10	44 24.0	131.5	45 12.8	130.7	46 01.3	129.8	46 49.4	129.0	47 37.0	128.1	10
2 00	45 48.0	134.4	46 38.0	133.6	47 27.7	132.8	48 16.9	131.9	49 05.7	131.1	2 00
1 50	47 08.0	137.5	47 59.0	136.7	48 49.8	135.9	49 40.1	135.1	50 30.2	134.2	1 50
40	48 23.2	140.7	49 15.5	139.9	50 07.5	139.1	50 59.1	138.3	51 50.3	137.5	40
30	49 33.6	144.0	50 26.9	143.3	51 20.0	142.6	52 12.8	141.8	53 05.3	141.0	30
20	50 38.2	147.5	51 32.7	146.8	52 27.1	146.1	53 21.1	145.4	54 14.8	144.7	20
10	51 36.8	151.2	52 32.4	150.5	53 27.8	149.9	54 22.9	149.3	55 18.0	148.6	10
1 00	52 28.9	154.9	53 25.6	154.4	54 22.2	153.8	55 18.5	153.2	56 14.6	152.6	1 00
0 50	53 14.0	158.8	54 11.5	158.4	55 09.0	157.9	56 06.2	157.4	57 03.5	156.9	0 50
40	53 51.5	162.9	54 50.0	162.6	55 48.3	162.2	56 46.6	161.7	57 44.7	161.3	40
30	54 21.2	167.1	55 20.2	166.8	56 19.2	166.5	57 18.2	166.2	58 17.1	165.8	30
20	54 42.7	171.4	55 42.3	171.2	56 41.9	170.9	57 41.4	170.7	58 40.9	170.5	20
10	54 55.7	175.7	55 55.6	175.6	56 55.4	175.5	57 55.3	175.3	58 55.2	175.2	10
0 00	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40					0 12.1	74.4	0 51.5	73.7	1 30.9	72.9	6 40
30	0 45.3	77.6	1 24.2	76.8	2 03.3	76.0	2 42.2	75.3	3 21.2	74.5	30
20	2 37.8	79.1	3 16.5	78.4	3 55.2	77.6	4 33.8	76.9	5 12.4	76.1	20
10	4 30.9	80.7	5 09.3	80.0	5 47.7	79.2	6 26.1	78.4	7 04.3	77.6	10
6 00	6 24.5	82.3	7 02.7	81.6	7 40.8	80.8	8 18.8	80.0	8 56.8	79.2	6 00
5 50	8 18.6	83.9	8 56.5	83.1	9 34.4	82.3	10 12.2	81.5	10 50.0	80.7	5 50
40	10 13.0	85.5	10 50.8	84.7	11 28.5	83.9	12 06.1	83.1	12 43.5	82.3	40
30	12 07.6	87.0	12 45.4	86.2	13 22.9	85.4	14 00.3	84.6	14 37.6	83.8	30
20	14 02.5	88.6	14 40.1	87.8	15 17.6	87.0	15 54.9	86.2	16 32.0	85.4	20
10	15 57.4	90.2	16 35.0	89.4	17 12.5	88.6	17 49.7	87.8	18 26.8	87.0	10
5 00	17 52.3	91.9	18 29.9	91.0	19 07.3	90.2	19 44.5	89.4	20 21.5	88.6	5 00
4 50	19 47.1	93.5	20 24.8	92.6	21 02.2	91.8	21 39.4	91.0	22 16.4	90.2	4 50
40	21 41.6	95.2	22 19.4	94.3	22 56.9	93.5	23 34.2	92.6	24 11.2	91.8	40
30	23 35.9	96.9	24 13.9	96.0	24 51.5	95.2	25 29.0	94.3	26 06.1	93.4	30
20	25 29.8	98.6	26 08.0	97.7	26 45.8	96.9	27 23.4	96.0	28 00.6	95.1	20
10	27 23.1	100.4	28 01.6	99.5	28 39.7	98.6	29 17.4	97.7	29 54.9	96.8	10
4 00	29 15.8	102.1	29 54.6	101.3	30 33.0	100.4	31 11.0	99.5	31 48.7	98.6	4 00
3 50	31 07.7	104.0	31 46.9	103.1	32 25.7	102.2	33 04.1	101.3	33 42.1	100.4	3 50
40	32 58.8	105.9	33 38.4	105.0	34 17.6	104.1	34 56.4	103.2	35 34.8	102.2	40
30	34 48.7	107.9	35 28.8	107.0	36 08.5	106.1	36 47.8	105.1	37 26.8	104.2	30
20	36 37.3	109.9	37 18.1	109.0	37 58.3	108.1	38 38.1	107.1	39 17.5	106.2	20
10	38 24.6	112.1	39 06.0	111.2	39 46.9	110.3	40 27.3	109.3	41 07.4	108.3	10
3 00	40 10.2	114.3	40 52.3	113.4	41 33.9	112.4	42 15.0	111.4	42 55.7	110.5	3 00
2 50	41 53.9	116.7	42 36.9	115.7	43 19.3	114.7	44 01.1	113.7	44 42.6	112.7	2 50
40	43 35.6	119.1	44 19.4	118.1	45 02.6	117.2	45 45.4	116.2	46 27.6	115.1	40
30	45 14.7	121.7	45 59.4	120.7	46 43.6	119.7	47 27.4	118.7	48 10.6	117.7	30
20	46 51.1	124.3	47 36.9	123.4	48 22.1	122.4	49 06.8	121.4	49 51.1	120.3	20
10	48 24.4	127.1	49 11.3	126.2	49 57.6	125.2	50 43.4	124.2	51 28.9	123.2	10
2 00	49 54.2	130.1	50 42.2	129.2	51 29.7	128.2	52 16.7	127.2	53 03.3	126.2	2 00
1 50	51 19.9	133.3	52 09.2	132.4	52 58.0	131.4	53 46.2	130.4	54 34.1	129.4	1 50
40	52 41.2	136.6	53 31.8	135.7	54 21.8	134.8	55 11.4	133.8	56 00.7	132.8	40
30	53 57.6	140.2	54 49.4	139.3	55 40.7	138.4	56 32.0	137.5	57 22.5	136.5	30
20	55 08.2	143.9	56 01.4	143.1	56 54.1	142.2	57 46.6	141.3	58 38.7	140.4	20
10	56 12.9	147.8	57 07.1	147.1	58 01.4	146.3	58 55.2	145.4	59 48.9	144.5	10
1 00	57 10.5	151.9	58 06.2	151.3	59 01.6	150.6	59 56.8	149.8	60 51.8	149.0	1 00
0 50	58 00.6	156.3	58 57.6	155.7	59 54.1	155.0	60 50.7	154.3	61 47.1	153.6	0 50
40	58 42.7	160.8	59 40.6	160.3	60 38.4	159.7	61 36.0	159.1	62 33.5	158.6	40
30	59 16.0	165.5	60 15.0	165.1	61 13.6	164.6	62 12.2	164.2	63 10.9	163.7	30
20	59 40.4	170.2	60 39.8	170.0	61 39.2	169.7	62 38.6	169.4	63 37.9	169.0	20
10	59 55.1	175.1	60 54.9	175.0	61 54.8	174.8	62 54.6	174.7	63 54.5	174.5	10
0 00	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00							0 34.6	66.7	1 15.0	66.0	7 00
6 50	0 21.4	70.6	1 01.1	69.8	1 40.9	69.1	2 00.2	68.3	3 00.6	67.5	6 50
40	2 10.3	72.2	2 49.6	71.4	3 28.9	70.7	4 08.2	69.9	4 47.4	69.1	40
30	4 00.1	73.8	4 39.0	73.0	5 17.8	72.3	5 56.5	71.5	6 35.3	70.7	30
20	5 51.0	75.3	6 29.4	74.6	7 07.8	73.8	7 46.0	73.0	8 24.2	72.2	20
10	7 42.4	76.8	8 20.4	76.1	8 58.4	75.3	9 36.3	74.5	10 14.2	73.7	10
6 00	9 34.6	78.4	10 12.3	77.6	10 49.9	76.8	11 27.4	76.0	12 04.8	75.2	6 00
5 50	11 26.8	79.9	12 04.9	79.1	12 42.1	78.3	13 19.3	77.5	13 56.2	76.7	5 50
40	13 20.8	81.5	13 57.9	80.7	14 34.9	79.9	15 11.8	79.0	15 48.4	78.2	40
30	15 14.7	83.0	15 51.6	82.2	16 28.3	81.4	17 04.8	80.6	17 41.2	79.7	30
20	17 08.9	84.6	17 45.6	83.7	18 22.1	82.9	18 58.5	82.1	19 34.6	81.2	20
10	19 03.4	86.1	19 40.1	85.3	20 16.3	84.4	20 52.4	83.6	21 28.3	82.7	10
5 00	20 58.2	87.7	21 34.7	86.9	22 10.9	86.0	22 46.8	85.1	23 22.5	84.3	5 00
4 50	22 53.0	89.3	23 29.5	88.4	24 05.6	87.5	24 41.4	86.6	25 16.9	85.8	4 50
40	24 47.9	90.9	25 24.3	90.0	26 00.4	89.1	26 36.2	88.2	27 11.6	87.3	40
30	26 42.8	92.5	27 19.3	91.6	27 55.2	90.7	28 31.0	89.8	29 06.4	88.9	30
20	28 37.5	94.2	29 14.0	93.3	29 50.2	92.4	30 26.0	91.4	31 01.4	90.5	20
10	30 31.9	95.9	31 08.7	95.0	31 44.9	91.1	32 20.8	93.1	32 56.2	92.1	10
4 00	32 26.0	97 6	33 02.9	96.7	33 39.4	95.8	34 15.4	94.8	34 51.0	93.8	4 00
3 50	34 19.8	99.4	34 56.9	98.5	35 33.5	97.5	36 09.8	96.5	36 45.6	95.5	3 50
40	36 12.8	101.3	36 50.2	100.3	37 27.2	99.3	38 03.7	98.3	38 39.8	97.3	40
30	38 05.1	103.2	38 42.9	102.2	39 20.3	101.2	39 57.1	100.2	40 33.4	99.1	30
20	39 56.4	105.2	40 34.8	104.2	41 12.6	103.2	41 49.9	102.1	42 26.6	101.0	20
10	41 46.8	107.2	42 25.7	106.2	43 04.1	105.2	43 41.8	104.1	44 19.0	103.0	10
3 00	43 35.8	109.4	44 15.4	108.4	44 54.3	107.3	45 32.7	106.2	46 10.5	105.1	3 00
2 50	45 23.4	111.7	46 03.8	110.6	46 43.3	109.5	47 22.2	108.4	48 00.7	107.3	2 50
40	47 09.3	114.1	47 50.4	113.0	48 30.8	111.9	49 10.6	110.8	49 49.8	109.6	40
30	48 53.1	116.6	49 35.1	115.5	50 16.4	114.4	50 57.1	113.2	51 37.1	112.0	30
20	50 34.7	119.3	51 17.7	118.1	52 00.0	117.0	52 41.7	115.8	53 22.7	114.6	20
10	52 13.5	122.1	52 57.6	121.0	53 41.1	119.8	54 23.9	118.6	55 06.0	117.4	10
2 00	53 49.3	125.1	54 34.6	124.0	55 19.3	122.8	56 03.4	121.6	56 46.7	120.4	2 00
1 50	55 21.4	128.3	56 08.0	127.2	56 54.0	126.0	57 39.4	124.8	58 24.1	123.6	1 50
40	56 49.4	131.8	57 37.4	130.7	58 24.9	129.5	59 11.8	128.3	59 58.0	127.0	40
30	58 12.6	135.5	59 02.1	134.4	59 51.2	133.2	60 39.5	132.0	61 27.5	130.8	30
20	59 30.4	139.4	60 21.5	138.3	61 12.1	137.2	62 02.2	136.1	62 51.7	134.9	20
10	60 42.0	143.6	61 34.7	142 6	62 27.0	141.6	63 18.7	140.5	64 10.0	139.3	10
1 00	61 46.4	148.1	62 40.7	147.2	63 34.6	146.2	64 28.2	145.2	65 21.3	144.1	1 00
50	62 43.0	152.9	63 39.0	152.0	64 34.5	151.2	65 29.5	150.3	66 24.2	149.3	0 50
40	63 30.9	157.9	64 28.0	157.2	65 25.0	156.5	66 21.8	155.7	67 18.4	154.8	40
30	64 09.2	163.2	65 07.6	162.7	66 06.1	162.1	67 03.8	161.4	68 01.7	160.7	30
20	64 37.2	168.7	65 36.4	168.3	66 35.6	167.9	67 34.7	167.5	68 33.8	167.0	20
10	64 54.3	174.3	65 54.1	174.1	66 53.9	173.9	67 53.6	173.7	68 53.4	173.5	10
0 00	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20							0 34.3	59.9	1 15.9	59.2	7 20
10	0 11.6	63.7	0 52.6	63.0	1 33.6	62.2	2 14.4	61.4	2 55.4	60.7	10
7 00	1 55.3	65.3	2 35.6	64.6	3 15.9	63.8	3 56.2	63.0	4 36.4	62.3	7 00
6 50	3 40.3	66.8	4 20.1	66.1	4 59.7	65.3	5 39.2	64.6	6 18.8	63.8	6 50
40	5 26.5	68.4	6 05.7	67.6	6 44.7	66.9	7 23.7	66.1	8 02.6	65.3	40
30	7 13.9	69.9	7 52.5	69.1	8 31.0	68.4	9 09.3	67.6	9 47.7	66.8	30
20	9 02.3	71.4	9 40.4	70.6	10 18.3	69.9	10 56.1	69.1	11 33.8	68.3	20
10	10 51.7	72.9	11 29.2	72.1	12 06.6	71.3	12 43.9	70.5	13 21.1	69.7	10
6 00	12 42.0	74.4	13 19.1	73.6	13 56.0	72.8	14 32.7	72.0	15 09.3	71.2	6 00
5 50	14 33.1	75.9	15 09.7	75.1	15 46.2	74.3	16 22.4	73.4	16 58.6	72.6	5 50
40	16 24.9	77.4	17 01.1	76.6	17 37.2	75.7	18 13.0	74.9	18 48.6	74.0	40
30	18 17.3	78.9	18 53.2	78.0	19 28.8	77.1	20 04.2	76.3	20 39.5	75.4	30
20	20 10.4	80.4	20 46.0	79.5	21 21.3	78.6	21 56.3	77.8	22 31.1	76.9	20
10	22 04.0	81.9	22 39.2	81.0	23 14.2	80.1	23 48.8	79.2	24 23.3	78.3	10
5 00	23 57.8	83.4	24 32.9	82.5	25 07.6	81.6	25 42.0	80.7	26 16.1	79.8	5 00
4 50	25 52.2	84.9	26 27.0	84.0	27 01.5	83.1	27 35.7	82.1	28 09.4	81.2	4 50
40	27 46.7	86.4	28 21.4	85.5	28 55.7	84.6	29 29.7	83.6	30 03.2	82.7	40
30	29 41.5	87.9	30 16.1	87.0	30 50.2	86.1	31 23.9	85.1	31 57.2	84.2	30
20	31 36.4	89.5	32 10.9	88.6	32 45.0	87.6	33 18.6	86.6	33 51.7	85.7	20
10	33 31.2	91.1	34 05.7	90.2	34 39.7	89.2	35 13.3	88.2	35 46.4	87.2	10
4 00	35 26.1	92.8	36 00.7	91.8	36 34.7	90.8	37 08.3	89.8	37 41.2	88.7	4 00
3 50	37 20.8	94.5	37 55.5	93.5	38 29.6	92.4	39 03.2	91.4	39 36.2	90.3	3 50
40	39 15.2	96.3	39 50.0	95.2	40 24.3	94.1	40 58.0	93.0	41 31.0	92.0	40
30	41 09.1	98.1	41 44.2	97.0	42 18.7	95.9	42 52.6	94.8	43 25.7	93.7	30
20	43 02.6	100.0	43 38.0	98.8	44 12.8	97.7	44 47.0	96.6	45 20.3	95.4	20
10	44 55.5	102.0	45 31.3	100.8	46 06.4	99.6	46 40.8	98.4	47 14.6	97.2	10
3 00	46 47.5	104.5	47 23.8	102.8	47 59.4	101.6	48 34.2	100.4	49 08.2	99.1	3 00
2 50	48 38.4	106.1	49 15.2	104.9	49 51.5	103.7	50 26.9	102.4	51 01.4	101.2	2 50
40	50 28.1	108.4	51 05.7	107.2	51 42.6	105.9	52 18.6	104.6	52 53.7	103.3	40
30	52 16.4	110.8	52 54.9	109.5	53 32.5	108.2	54 09.1	106.9	54 45.0	105.6	30
20	54 02.9	113.4	54 42.2	112.1	55 20.7	110.7	55 58.4	109.3	56 35.0	107.9	20
10	55 47.2	116.1	56 27.7	114.8	57 07.2	113.4	57 45.9	112.0	58 23.7	110.6	10
2 00	57 29.2	119.1	58 10.8	117.7	58 51.6	116.3	59 31.4	114.9	60 10.1	113.4	2 00
1 50	59 08.0	122.3	59 51.0	120.9	60 33.1	119.5	61 14.2	118.0	61 54.5	116.4	1 50
40	60 43.3	125.7	61 27.8	124.4	62 11.5	122.9	62 54.2	121.3	63 35.8	119.7	40
30	62 14.5	129.5	63 00.5	128.1	63 46.0	126.6	64 30.2	125.0	65 13.6	123.4	30
20	63 40.4	133.6	64 28.4	132.2	65 15.6	130.7	66 02.0	129.2	66 47.3	127.6	20
10	65 00.7	138.0	65 50.5	136.7	66 39.9	135.3	67 28.0	133.7	68 15.6	132.1	10
1 00	66 13.8	142.9	67 05.7	141.6	67 57.0	140.3	68 47.6	138.8	69 37.2	137.2	1 00
0 50	67 18.9	148.2	68 12.7	147.0	69 06.1	145.8	69 58.9	144.4	70 51.2	149.9	0 50
40	68 14.6	153.9	69 10.4	152.9	70 05.8	151.8	71 00.9	150.6	71 55.3	149.3	40
30	68 59.6	160.0	69 57.0	159.3	70 54.2	158.3	71 51.2	157.3	72 47.7	156.2	30
20	69 32.7	166.4	70 31.5	165.9	71 30.3	165.3	72 28.8	164.6	73 27.3	163.8	20
10	69 53.1	173.2	70 52.8	172.9	71 52.5	172.6	72 52.1	172.2	73 51.7	171.8	10
0 00	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

142.9

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 55.0	91.6	1 16.3	92.4	0 37.7	93.2					5 50
40	3 49.7	93.2	3 11.0	94.0	2 32.3	94.8	1 53.6	95.5	1 14.8	96.3	40
30	5 44.3	94.8	5 05.6	95.6	4 26.6	96.4	3 47.8	97.1	3 08.8	97.9	30
20	7 38.6	96.5	6 59.7	97.2	6 20.6	98.0	5 41.6	98.8	5 02.4	99.5	20
10	9 32.6	98.1	8 53.5	98.9	8 14.2	99.6	7 35.0	100.4	6 55.6	101.1	10
5 00	11 26.1	99.8	10 46.7	100.6	10 07.2	101.3	9 27.6	102.1	8 47.9	102.8	5 00
4 50	13 19.1	101.5	12 39.4	102.3	11 59.5	103.0	11 19.6	103.8	10 39.5	104.5	4 50
40	15 11.3	103.2	14 31.3	104.0	13 51.1	104.7	13 10.8	105.5	12 30.3	106.2	40
30	17 02.8	104.9	16 22.3	105.7	15 41.7	106.4	15 01.1	107.2	14 20.2	108.0	30
20	18 53.4	106.7	18 12.6	107.5	17 31.5	108.2	16 50.3	109.0	16 08.9	109.8	20
10	20 42.9	108.5	20 01.5	109.3	19 20.0	110.0	18 38.3	110.8	17 56.4	111.6	10
4 00	22 31.3	110.4	21 49.5	111.1	21 07.4	111.9	20 25.1	112.7	19 42.6	113.4	4 00
3 50	24 18.2	112.3	23 35.8	113.0	22 53.2	113.8	22 10.4	114.6	21 27.2	115.3	3 50
40	26 03.9	114.2	25 20.9	115.0	24 37.6	115.8	23 54.0	116.5	23 10.3	117.3	40
30	27 47.8	116.2	27 04.1	117.0	26 20.1	117.8	25 35.9	118.5	24 51.4	119.3	30
20	29 29.9	118.3	28 45.5	119.1	28 00.7	119.9	27 15.8	120.6	26 30.6	121.4	20
10	31 10.0	120.5	30 24.8	121.3	29 39.3	122.0	28 53.7	122.7	28 07.7	123.5	10
3 00	32 47.9	122.7	32 01.9	123.5	31 15.6	124.2	30 29.0	124.9	29 42.2	125.7	3 00
2 50	34 23.2	125.1	33 36.3	125.8	32 49.2	126.5	32 01.8	127.3	31 14.2	128.0	2 50
40	35 55.9	127.5	35 08.2	128.2	34 20.1	128.9	33 31.8	129.7	32 43.3	130.4	40
30	37 25.5	130.0	36 36.8	130.7	35 47.9	131.4	34 58.8	132.1	34 09.2	132.8	30
20	38 52.0	132.6	38 02.3	133.3	37 12.4	134.0	36 22.2	134.7	35 31.8	135.3	20
10	40 14.7	135.3	39 24.0	136.0	38 33.2	136.6	37 42.2	137.3	36 50.8	138.0	10
2 00	41 33.6	138.1	40 42.0	138.8	39 50.0	139.4	38 57.9	140.0	38 05.6	140.7	2 00
1 50	42 48.1	141.0	41 55.5	141.7	41 02.7	142.3	40.09.6	142.9	39 16.3	143.5	1 50
40	43 58.2	144.0	43 04.5	144.7	42 10.6	145.3	41 16.5	145.9	40 22.3	146.4	40
30	45 03.0	147.2	44 08.3	147.8	43 13.5	148.3	42 18.5	148.9	41 23.4	149.4	30
20	46 02.5	150.5	45 06.9	151.0	44 11.1	151.5	43 15.2	152.0	42 19.2	152.5	20
10	46 56.0	153.9	45 59.6	154.4	45 03.0	154.8	44 06.2	155.3	43 09.3	155.7	10
1 00	47 43.6	157.4	46 46.2	157.8	45 48.7	158.2	44 51.1	158.6	43 53.5	159.0	1 00
0 50	48 24.5	161.0	47 26.2	161.3	46 28.0	161.7	45 29.8	162.0	44 31.5	162.4	0 50
40	48 58.4	164.7	47 59.6	165.0	47 00.8	165.3	46 01.9	165.5	45 03.0	165.8	40
30	49 25.2	168.4	48 25.9	168.7	47 26.6	168.9	46 27.2	169.1	45 27.8	169.3	30
20	49 44.5	172.2	48 44.8	172.4	47 45.1	172.6	46 45.3	172.7	45 45.6	172.9	20
10	49 56.1	176.1	48 56.1	176.2	47 56.2	176.3	46 56.4	176.3	45 56.4	176.4	10
0 00	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 36.1	97.0									5 40
30	2 29.9	98.6	1 50.9	99.4	1 11.9	100.2	0 32.9	100.9			30
20	4 23.2	100.3	3 44.0	101.1	3 04.7	101.8	2 25.4	102.6	1 46.1	103.3	20
10	6 16.0	101.9	5 36.5	102.7	4 56.9	103.4	4 17.2	104.2	3 37.5	104.9	10
5 00	8 08.1	103.6	7 28.2	104.3	6 48.2	105.1	6 08.2	105.8	5 28.1	106.6	5 00
4 50	9 59.3	105.3	9 19.0	106.0	8 38.7	106.8	7 58.3	107.5	7 17.6	108.3	4 50
40	11 49.7	107.0	11 09.0	107.7	10 28.2	108.5	9 47.3	109.2	9 06.3	110.0	40
30	13 39.1	108.7	12 58.0	109.5	12 16.6	110.2	11 35.2	110.9	10 53.7	111.7	30
20	15 27.4	110.5	14 45.7	111.3	14 03.9	112.0	13 21.9	112.7	12 39.8	113.4	20
10	17 14.2	112.3	16 32.1	113.1	15 49.7	113.8	15 07.2	114.5	14 24.5	115.2	10
4 00	19 00.0	114.2	18 17.1	114.9	17 34.2	115.6	16 51.0	116.3	16 07.7	117.1	4 00
3 50	20 43.9	116.1	20 00.6	116.8	19 16.9	117.5	18 33.0	118.2	17 49.0	119.0	3 50
40	22 26.4	118.0	21 42.2	118.7	20 57.8	119.5	20 13.3	120.2	19 28.6	120.9	40
30	24 06.8	120.0	23 21.9	120.7	22 36.9	121.5	21 51.7	122.2	21 06.2	122.9	30
20	25 45.2	122.1	24 59.6	122.8	24 13.8	123.5	23 27.8	124.2	22 41.6	124.9	20
10	27 21.4	124.2	26 35.1	124.9	25 48.4	125.6	25 01.7	126.3	24 14.8	127.0	10
3 00	28 55.2	126.4	28 08.0	127.1	27 20.5	127.8	26 32.9	128.5	25 45.1	129.2	3 00
2 50	30 26.2	128.7	29 38.2	129.4	28 50.0	130.0	28 01.5	130.7	27 12.7	131.4	2 50
40	31 54.6	131.0	31 05.6	131.7	30 16.4	132.4	29 27.0	133.0	28 37.4	133.7	40
30	33 19.6	133.5	32 29.7	134.1	31 39.6	134.8	30 49.3	135.4	29 58.8	136.1	30
20	34 41.2	136.0	33 50.4	136.6	32 59.4	137.3	32 08.2	137.9	31 16.8	138.5	20
10	35 59.2	138.6	35 07.4	139.2	34 15.5	139.8	33 23.4	140.4	32 31.1	141.0	10
2 00	37 13.1	141.3	36 20.5	141.9	35 27.6	142.5	34 34.6	143.0	33 41.4	143.6	2 00
1 50	38 22.9	144.1	37 29.2	144.6	36 35.5	145.2	35 41.5	145.7	34 47.3	146.3	1 50
40	39 27.9	147.0	38 33.4	147.5	37 38.7	148.0	36 43.9	148.5	35 48.9	149.0	40
30	40 28.1	150.0	39 32.6	150.5	38 37.1	150.9	37 41.5	151.4	36 45.6	151.9	30
20	41 23.1	153.0	40 26.8	153.5	39 30.4	153.9	38 33.9	154.3	37 37.3	154.8	20
10	42 12.2	156.1	41 15.2	156.6	40 18.1	157.0	39 20.8	157.3	38 23.5	157.7	10
1 00	42 55.8	159.4	41 58.0	159.8	41 00.2	160.1	40 02.3	160.4	39 04.3	160.8	1 00
0 50	43 33.2	162.7	42 34.8	163.0	41 36.3	163.3	40 37.7	163.6	39 39.1	163.9	0 50
40	44 04.1	166.1	43 05.1	166.3	42 06.1	166.6	41 07.1	166.8	40 08.0	167.1	40
30	44 28.4	169.5	43 29.0	169.7	42 29.5	169.9	41 30.1	170.1	40 30.6	170.3	30
20	44 45.9	173.0	43 46.2	173.1	42 46.4	173.2	41 46.7	173.4	40 46.9	173.5	20
10	44 56.5	176.5	43 56.6	176.6	42 56.6	176.6	41 56.7	176.7	40 56.7	176.7	10
0 00	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 06.7	104.1	0 27.3	104.8							5 20
10	2 57.7	105.7	2 17.9	106.4	1 38.2	107.2	0 58.4	107.9	0 18.5	108.7	10
5 00	4 47.9	107.4	4 07.7	108.1	3 27.4	108.8	2 47.1	109.5	2 06.8	110.3	5 00
4 50	6 37.1	109.0	5 56.4	109.7	5 15.6	110.5	4 34.9	111.2	3 53.9	112.0	4 50
40	8 25.1	110.7	7 43.9	111.4	7 02.6	112.2	6 21.3	112.9	5 39.9	113.6	40
30	10 12.0	112.4	9 30.3	113.1	8 48.4	113.9	8 06.6	114.6	7 24.5	115.3	30
20	11 57.5	114.2	11 15.2	114.9	10 32.7	115.6	9 50.2	116.3	9 07.6	117.1	20
10	13 41.7	116.0	12 58.7	116.7	12 15.6	117.4	11 32.4	118.1	10 49.1	118.8	10
4 00	15 24.1	117.8	14 40.5	118.5	13 56.7	119.2	13 12.9	119.9	12 28.9	120.6	4 00
3 50	17 04.9	119.7	16 20.6	120.4	15 36.2	121.1	14 51.7	121.8	14 06.9	122.5	3 50
40	18 43.7	121.6	17 58.7	122.3	17 13.5	123.0	16 28.2	123.7	15 42.8	124.4	40
30	20 20.6	123.6	19 34.8	124.3	18 48.9	124.9	18 02.8	125.6	17 16.7	126.3	30
20	21 55.2	125.6	21 08.6	126.3	20 21.9	126.9	19 35.1	127.6	18 48.0	128.3	20
10	23 27.4	127.7	22 40.1	128.4	21 52.5	129.0	21 04.8	129.7	20 17.0	130.3	10
3 00	24 57.0	129.8	24 08.8	130.5	23 20.4	131.1	22 31.9	131.8	21 43.2	132.4	3 00
2 50	26 23.8	132.0	25 34.8	132.7	24 45.5	133.3	23 56.1	134.0	23 06.6	134.6	2 50
40	27 47.6	134.3	26 57.7	134.9	26 07.6	135.5	25 17.4	136.2	24 26.9	136.8	40
30	29 08.2	136.7	28 17.3	137.3	27 26.4	137.9	26 35.3	138.5	25 44.0	139.0	30
20	30 25.3	139.1	29 33.6	139.7	28 41.7	140.3	27 49.7	140.8	26 57.6	141.4	20
10	31 38.7	141.5	30 46.1	142.1	29 53.3	142.7	29 00.4	143.2	28 07.4	143.8	10
2 00	32 48.0	144.1	31 54.5	144.7 174.7	31 00.9	145.2	30 07.2	145.7	29 13.3	146.2	2 00
1 50	33 53.2	146.8	32 58.8	147.3	32 04.4	147.8	31 09.7	148.3	30 15.1	148.8	1 50
40	34 53.8	149.5	33 58.6	150.0	33 03.3	150.4	32 07.9	150.9	31 12.4	151.4	40
30	35 49.7	152.3	34 53.7	152.8	33 57.6	153.2	33 01.6	153.6	32 05.4	154.0	30
20	36 40.6	155.2	35 43.8	155.6	34 46.9	156.0	33 50.0	156.3	32 53.0	156.7	20
10	37 26.2	158.1	36 28.6	158.5	35 31.2	158.8	34 33.7	159.1	33 35.9	159.5	10
1 00	38 06.2	161.1	37 08.1	161.4	36 09.9	161.7	35 11.7	162.0	34 13.5	162.3	1 00
0 50	38 40.5	164.2	37 41.9	164.5	36 43.2	164.7	35 44.4	164.9	34 45.7	165.2	0 50
40	39 08.9	167.3	38 09.7	167.5	37 10.5	167.7	36 11.3	167.9	35 12.1	168.1	40
30	39 31.1	170.4	38 31.7	170.6	37 32.1	170.7	36 32.7	170.9	35 33.0	171.0	30
20	39 47.1	173.6	38 47.3	173.7	37 47.5	173.8	36 47.7	173.9	35 47.9	174.0	20
10	39 56.7	176.8	38 56.8	176.8	37 56.8	176.9	36 57.0	177.0	35 57.0	177.0	10
0 00	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 26.5	111.0	0 46.1	111.8	0 05.9	112.5					5 00
4 50	3 13.1	112.6	2 32.2	113.4	1 51.2	114.1	1 10.2	114.9	0 29.4	115.6	4 50
40	4 58.4	114.3	4 16.9	115.1	3 35.4	115.8	2 53.8	116.5	2 12.2	117.2	40
30	6 42.4	116.0	6 00.4	116.8	5 18.1	117.5	4 35.9	118.2	3 53.6	118.9	30
20	8 24.9	117.8	7 42.1	118.5	6 59.3	119.2	6 16.4	119.9	5 33.5	120.6	20
10	10 05.8	119.5	9 22.4	120.2	8 38.8	120.9	7 55.1	121.6	7 11.5	122.3	10
4 00	11 44.8	121.3	11 00.6	122.0	10 16.4	122.7	9 32.0	123.4	8 47.6	124.1	4 00
3 50	13 22.1	123.1	12 37.2	123.8	11 52.1	124.5	11 07.1	125.2	10 21.9	125.9	3 50
40	14 57.2	125.0	14 11.5	125.7	13 25.8	126.4	12 39.9	127.0	11 54.0	127.7	40
30	16 30.3	126.9	15 43.8	127.6	14 57.2	128.3	14 10.5	128.9	13 23.7	129.6	30
20	18 00.9	128.9	17 13.6	129.6	16 26.2	130.2	15 38.7	130.8	14 51.1	131.5	20
10	19 29.0	130.9	18 40.9	131.6	17 52.7	132.2	17 04.4	132.8	16 15.9	133.4	10
3 00	20 54.4	133.0	20 05.5	133.6	19 16.4	134.2	18 27.2	134.8	17 37.9	135.4	3 00
2 50	22 17.0	135.1	21 27.2	135.7	20 37.2	136.3	19 47.1	136.9	18 57.0	137.5	2 50
40	23 36.4	137.3	22 45.7	137.9	21 54.9	138.5	21 04.0	139.1	20 13.0	139.6	40
30	24 52.7	139.5	24 01.1	140.1	23 09.4	140.7	22 17.7	141.3	21 25.7	141.8	30
20	26 05.3	141.9	25 12.9	142.5	24 20.4	143.0	23 27.8	143.5	22 35.1	144.0	20
10	27 14.3	144.3	26 21.1	144.8	25 27.8	145.3	24 34.2	145.8	23 40.7	146.3	10
2 00	28 19.4	146.7	27 25.3	147.2	26 31.2	147.7	25 36.9	148.2	24 42.5	148.6	2 00
1 50	29 20.4	149.2	28 25.5	149.7	27 30.4	150.1	26 35.4	150.6	25 40.2	151.0	1 50
40	30 16.8	151.8	29 21.1	152.2	28 25.4	152.6	27 29.6	153.1	26 33.8	153.5	40
30	31 08.9	154.4	30 12.5	154.8	29 16.0	155.2	28 19.4	155.6	27 22.9	156.0	30
20	31 56.0	157.1	30 58.9	157.5	30 01.8	157.9	29 04.6	158.2	28 07.3	158.5	20
10	32 38.4	159.8	31 40.6	160.1	30 42.7	160.4	29 44.9	160.8	28 47.1	161.1	10
1 00	33 15.2	162.6	32 16.9	162.9	31 18.6	163.1	30 20.2	163.4	29 21.8	163.7	1 00
0 50	33 46.9	165.4	32 48.2	165.7	31 49.3	165.9	30 50.4	166.1	29 51.5	166.3	0 50
40	34 12.9	168.3	33 13.7	168.5	32 14.5	168.7	31 15.3	168.9	30 16.0	169.0	40
30	34 33.6	171.2	33 34.0	171.3	32 34.4	171.5	31 34.8	171.6	30 35.2	171.7	30
20	34 48.1	174.1	33 48.3	174.2	32 48.5	174.3	31 48.7	174.4	30 48.9	174.5	20
10	34 57.1	177.0	33 57.1	177.1	32 57.1	177.1	31 57.1	177.2	30 57.2	177.2	10
0 00	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	1 30.6	117.9	0 49.0	118.7	0 07.4	119.4					4 40
30	3 11.4	119.6	2 29.0	120.3	1 46.7	121.0	1 04.2	121.7	0 21.8	122.4	30
20	4 50.5	121.3	4 07.4	122.0	3 24.3	122.7	2 41.1	123.4	1 57.9	124.1	20
10	6 27.7	123.0	5 43.8	123.7	5 00.0	124.4	4 16.2	125.1	3 32.2	125.7	10
4 00	8 03.1	124.7	7 18.6	125.4	6 33.9	126.1	5 49.2	126.8	5 04.5	127.4	4 00
3 50	9 36.6	126.5	8 51.2	127.2	8 05.8	127.8	7 20.3	128.5	6 34.7	129.1	3 50
40	11 07.9	128.3	10 21.7	129.0	9 35.5	129.6	8 49.1	130.3	8 02.7	130.9	40
30	12 36.7	130.2	11 49.7	130.8	11 02.7	131.4	10 15.6	132.1	9 28.4	132.7	30
20	14 03.4	132.1	13 15.6	132.7	12 27.6	133.3	11 39.6	134.0	10 51.5	134.6	20
10	15 27.3	134.0	14 38.6	134.6	13 49.8	135.2	13 01.0	135.9	12 12.1	136.5	10
3 00	16 48.5	136.0	15 59.0	136.6	15 09.3	137.2	14 19.6	137.8	13 29.8	138.4	3 00
2 50	18 06.7	138.1	17 16.3	138.7	16 25.9	139.3	15 35.6	139.8	14 44.7	140.4	2 50
40	19 21.9	140.2	18 30.7	140.8	17 39.4	141.3	16 48.0	141.8	15 56.5	142.4	40
30	20 33.7	142.3	19 41.7	142.9	18 49.6	143.4	17 57.3	143.9	17 05.0	144.5	30
20	21 42.3	144.5	20 49.4	145.1	19 56.4	145.6	19 03.3	146.1	18 10.1	146.6	20
10	22 47.1	146.8	21 53.3	147.3	20 59.5	147.8	20 05.6	148.2	19 11.7	148.7	10
2 00	23 48.1	149.1	22 53.6	149.6	21 58.9	150.0	21 04.2	150.4	20 09.4	150.9	2 00
1 50	24 45.0	151.5	23 49.7	151.9	22 54.3	152.3	21 58.9	152.7	21 03.5	153.1	1 50
40	25 37.8	153.9	24 41.8	154.3	23 45.7	154.7	22 49.5	155.0	21 53.3	155.4	40
30	26 26.2	156.3	25 29.4	156.7	24 32.7	157.1	23 35.9	157.4	22 39.0	157.7	30
20	27 10.0	158.8	26 12.7	159.2	25 15.2	159.5	24 17.8	159.8	23 20.3	160.1	20
10	27 49.2	161.4	26 51.2	161.7	25 53.3	162.0	24 55.2	162.2	23 57.2	162.5	10
1 00	28 23.4	164.0	27 24.9	164.2	26 26.4	164.5	25 27.9	164.7	24 29.3	165.0	1 00
0 50	28 52.7	166.6	27 53.7	166.8	26 54.8	167.0	25 55.8	167.2	24 56.9	167.4	0 50
40	29 16.8	169.2	28 17.5	169.4	27 18.2	169.6	26 18.8	169.7	25 19.5	169.9	40
30	29 35.6	171.9	28 35.9	172.1	27 36.4	172.2	26 36.7	172.3	25 37.1	172.4	30
20	29 49.1	174.6	28 49.3	174.7	27 49.5	174.8	26 49.6	174.8	25 49.8	174.9	20
10	29 57.3	177.3	28 57.3	177.3	27 57.4	177.4	26 57.4	177.4	25 57.5	177.4	10
0 00	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 05.1	86.1	0 44.4	85.3	6 10
6 00	0 00.0	90.0	0 39.4	89.3	1 18.7	88.5	1 58.1	87.7	2 37.4	87.0	6 00
5 50	1 53.2	91.6	2 32.6	90.9	3 11.9	90.2	3 51.2	89.4	4 30.5	88.6	5 50
40	3 46.3	93.3	4 25.7	92.6	5 05.1	91.8	5 44.5	91.0	6 23.8	90.3	40
30	5 39.2	94.9	6 18.7	94.2	6 58.1	93.4	7 37.6	92.6	8 16.9	91.9	30
20	7 31.9	96.6	8 11.5	95.8	8 51.1	95.1	9 30.6	94.3	10 10.0	93.6	20
10	9 24.0	98.3	10 03.9	97.5	10 43.7	96.8	11 23.4	96.0	12 02.8	95.2	10
5 00	11 15.9	100.0	11 56.0	99.2	12 35.9	98.5	13 15.7	97.7	13 55.4	96.9	5 00
4 50	13 07.0	101.7	13 47.4	100.9	14 27.6	100.2	15 07.7	99.4	15 47.6	98.6	4 50
40	14 57.5	103.4	15 38.2	102.7	16 18.7	101.9	16 59.1	101.1	17 39.3	100.4	40
30	16 47.2	105.2	17 28.2	104.5	18 09.1	103.7	18 49.8	102.9	19 30.2	102.1	30
20	18 36.0	107.0	19 17.5	106.3	19 58.7	105.5	20 39.8	104.7	21 20.6	103.9	20
10	20 23.6	108.9	21 05.6	108.1	21 47.2	107.3	22 28.8	106.5	23 10.0	105.7	10
4 00	22 10.2	110.7	22 52.6	110.0	23 34.8	109.2	24 16.8	108.4	24 58.5	107.6	4 00
3 50	23 55.4	112.7	24 38.3	111.9	25 21.0	111.1	26 03.6	110.3	26 45.8	109.5	3 50
40	25 39.1	114.7	26 22.6	113.9	27 05.9	113.1	27 49.0	112.3	28 31.7	111.5	40
30	27 21.0	116.7	28 05.2	116.0	28 49.2	115.2	29 32.9	114.4	30 16.3	113.6	30
20	29 01.2	118.8	29 46.1	118.1	30 30.7	117.3	31 15.1	116.5	31 59.2	115.7	20
10	30 39.3	121.0	31 24.9	120.3	32 10.3	119.5	32 55.4	118.7	33 40.2	117.9	10
3 00	32 15.2	123.3	33 01.6	122.6	33 47.8	121.8	34 33.6	121.0	35 19.2	120.2	3 00
2 50	33 48.5	125.6	34 35.8	124.9	35 22.8	124.1	36 09.5	123.3	36 55.8	122.5	2 50
40	35 19.2	128.0	36 07.3	127.3	36 55.2	126.5	37 42.7	125.8	38 29.9	125.0	40
30	36 46.8	130.5	37 35.9	129.8	38 24.6	129.1	39 13.0	128.4	40 01.2	127.6	30
20	38 11.2	133.2	39 01.1	132.4	39 50.8	131.7	40 40.3	131.0	41 29.4	130.2	20
10	39 31.8	135.9	40 22.8	135.2	41 13.4	134.5	42 03.9	133.7	42 54.1	133.0	10
2 00	40 48.8	138.7	41 40.7	138.0	42 32.4	137.3	43 23.8	136.6	44 14.9	135.9	2 00
1 50	42 01.3	141.6	42 54.2	140.9	43 46.9	140.3	44 39.4	139.6	45 31.6	138.9	1 50
40	43 09.4	144.6	44 03.3	144.0	44 57.0	143.4	45 50.4	142.7	46 43.7	142.0	40
30	44 13.3	147.7	45 07.4	147.2	46 02.0	146.6	46 56.5	146.0	47 50.6	145.3	30
20	45 10.2	151.0	46 05.9	150.5	47 01.6	149.9	47 57.1	149.4	48 52.3	148.8	20
10	46 02.0	154.3	46 58.8	153.9	47 55.4	153.4	48 51.8	152.9	49 47.9	152.3	10
1 00	46 48.1	157.8	47 45.6	157.4	48 43.0	156.9	49 40.3	156.5	50 37.4	156.0	1 00
0 50	47 27.7	161.3	48 25.9	161.0	49 23.9	160.6	50 22.1	160.2	51 20.0	159.8	0 50
40	48 00.5	165.0	48 59.3	164.7	49 58.1	164.4	50 56.8	164.0	51 55.5	163.7	40
30	48 26.4	168.7	49 25.6	168.5	50 25.0	168.2	51 24.3	167.9	52 23.5	167.7	30
20	48 45.0	172.4	49 44.8	172.3	50 44.4	172.1	51 44.1	171.9	52 43.8	171.8	20
10	48 56.2	176.2	49 56.1	176.1	50 56.0	176.0	51 56.0	175.9	52 55.9	175.9	10
0 00	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 16.3	78.4	6 30
20			0 10.9	82.2	0 50.4	81.4	1 30.0	80.7	2 09.5	79.9	20
10	1 23.9	84.6	2 03.3	83.8	2 42.7	83.1	3 22.0	82.3	4 01.3	81.5	10
6 00	3 16.7	86.2	3 56.0	85.5	4 35.2	84.7	5 14.4	84.0	5 53.5	83.2	6 00
5 50	5 09.8	87.8	5 48.9	87.1	6 28.1	86.3	7 07.1	85.6	7 46.0	84.8	5 50
40	7 03.0	89.5	7 42.1	88.7	8 21.1	88.0	9 00.0	87.2	9 38.9	86.4	40
30	8 56.1	91.1	9 35.2	90.3	10 14.3	89.6	10 53.2	88.8	11 31.9	88.0	30
20	10 49.3	92.8	11 28.4	92.0	12 07.5	91.2	12 46.4	90.5	13 25.2	89.7	20
10	12 42.2	94.5	13 21.5	93.7	14 00.6	92.9	14 39.6	92.1	15 18.3	91.3	10
5 00	14 34.9	96.1	15 14.3	95.4	15 53.6	94.6	16 32.6	93.8	17 11.5	93.0	5 00
4 50	16 27.3	97.8	17 06.9	97.1	17 46.3	96.3	18 25.5	95.5	19 04.4	94.7	4 50
40	18 19.3	99.6	18 59.0	98.8	19 38.6	98.0	20 17.9	97.2	20 57.1	96.4	40
30	20 10.6	101.3	20 50.6	100.5	21 30.4	99.7	22 10.1	98.9	22 49.4	98.1	30
20	22 01.2	103.1	22 41.6	102.3	23 21.8	101.5	24 01.6	100.7	24 41.2	99.9	20
10	23 51 0	104.9	24 31.8	104.1	25 12.2	103.3	25 52.5	102.5	26 32.4	101.7	10
4 00	25 39.9	106.8	26 21.1	106.0	27 02.0	105.2	27 42.6	104.4	28 22.9	103.5	4 00
3 50	27 27.8	108.7	28 09.3	107.9	28 50.7	107.1	29 31.8	106.3	30 12.5	105.4	3 50
40	29 14.3	110.7	29 56.4	109.9	30 38.3	109.1	31 19.9	108.3	32 01.1	107.4	40
30	30 59.3	112.8	31 42.1	112.0	32 24.6	111.1	33 06.7	110.3	33 48.5	109.4	30
20	32 42.9	114.9	33 26.3	114.1	34 09.5	113.2	34 52.2	112.4	35 34.5	111.5	20
10	34 24.7	117.1	35 08.8	116.3	35 52.6	115.4	36 36.1	114.6	37 09.0	113.7	10
3 00	36 04.4	119.4	36 49.3	118.5	37 33.9	117.7	38 18.0	116.8	39 01.8	115.9	3 00
2 50	37 41.9	121.7	38 27.7	120.9	39 12.9	120.1	39 57.9	119.2	40 42.5	118.3	2 50
40	39 16.8	124.2	40 03.4	123.4	40 49.7	122.5	41 35.5	121.7	42 20.9	120.8	40
30	40 49.1	126.8	41 36.6	126.0	42 23.7	125.1	43 10.5	124.3	43 56.8	123.4	30
20	42 18.2	129.4	43 06.7	128.6	43 54.8	127.8	44 42.5	126.9	45 29.9	126.1	20
10	43 43.9	132.2	44 33.4	131.4	45 22.5	130.6	46 11.3	129.7	46 59.7	128.9	10
2 00	45 05.8	135.1	45 56.3	134.4	46 46.6	133.6	47 36.5	132.7	48 26.0	131.9	2 00
1 50	46 23.4	138.2	47 15.2	137.4	48 06.4	136.7	48 57.6	135.9	49 48.1	135.1	1 50
40	47 36.6	141.3	48 29.4	140.6	49 21.9	139.9	50 14.0	139.1	51 05.7	138.3	40
30	48 44.7	144.7	49 38.6	144.0	50 32.1	143.3	51 26.5	142.6	52 18.4	141.8	30
20	49 47.4	148.2	50 42.3	147.5	51 37.0	146.9	52 31.5	146.2	53 25.6	145.5	20
10	50 44.1	151.8	51 40.0	151.2	52 35.7	150.6	53 31.4	150.0	54 26.6	149.3	10
1 00	51 34.4	155.5	52 31.3	155.0	53 28.1	154.4	54 24.7	153.9	55 21.1	153.3	1 00
0 50	52 17.9	159.4	53 15.6	158.9	54 13.2	158.5	55 10.9	158.0	56 08.2	157.5	0 50
40	52 54.1	163.4	53 52.7	163.0	54 51.1	162.6	55 49.5	162.2	56 47.8	161.7	40
30	53 22.8	167.5	54 21.9	167.2	55 20.9	166.9	56 20.0	166.6	57 19.0	166.2	30
20	53 43.4	171.6	54 43.0	171.4	55 42.6	171.2	56 42.1	171.0	57 41.7	170.7	20
10	53 55.8	175.8	54 55.8	175.7	55 55.6	175.6	56 55.6	175.5	57 55.4	175.3	10
0 00	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

51° 25.4 37° 19.0

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 00.8	71.3	6 50
40					0 28.2	74.4	1 08.4	73.7	1 48.5	73.0	40
30	0 58.1	77.6	1 37.9	76.8	2 17.7	76.1	2 57.5	75.3	3 37.1	74.6	30
20	2 49.1	79.2	3 28.6	78.4	4 08.0	77.7	4 47.4	76.9	5 26.8	76.2	20
10	4 40.6	80.8	5 19.8	80.0	5 58.9	79.3	6 37.9	78.5	7 17.0	77.8	10
6 00	6 32.5	82.4	7 11.5	81.6	7 50.4	80.9	8 29.2	80.1	9 07.9	79.4	6 00
5 50	8 24.9	84.0	9 03.6	83.3	9 42.5	82.5	10 21.0	81.7	10 59.5	80.9	5 50
40	10 17.6	85.6	10 56.3	84.9	11 34.8	84.1	12 13.2	83.3	12 51.5	82.5	40
30	12 10.5	87.2	12 49.2	86.5	13 27.6	85.7	14 05.8	84.9	14 43.8	84.1	30
20	14 03.8	88.9	14 42.2	88.1	15 20.5	87.3	15 59.2	86.5	16 36.8	85.7	20
10	15 56.9	90.5	16 35.5	89.7	17 13.8	88.9	17 51.8	88.1	18 29.7	87.3	10
5 00	17 50.2	92.2	18 28.7	91.4	19 06.9	90.6	19 45.0	89.7	20 22.9	88.9	5 00
4 50	19 43.2	93.9	20 21.7	93.0	21 00.2	92.2	21 38.1	91.4	22 16.0	90.5	4 50
40	21 36.0	95.6	22 14.7	94.7	22 53.1	93.9	23 31.2	93.1	24 09.1	92.2	40
30	23 28.5	97.3	24 07.5	96.4	24 45.9	95.6	25 24.1	94.8	26 02.1	93.9	30
20	25 20.6	99.1	25 59.7	98.2	26 38.4	97.4	27 16.9	96.5	27 55.0	95.6	20
10	27 12.1	100.9	27 51.4	100.0	28 30.4	99.2	29 09.1	98.3	29 47.5	97.4	10
4 00	29 02.9	102.7	29 42.6	101.8	30 21.9	101.0	31 00.9	100.1	31 39.5	99.2	4 00
3 50	30 52.8	104.6	31 33.0	103.7	32 12.7	102.8	32 52.0	101.9	33 30.9	101.0	3 50
40	32 42.0	106.6	33 22.5	105.7	34 02.6	104.8	34 42.3	103.8	35 21.7	102.9	40
30	34 29.9	108.6	35 10.9	107.7	35 51.6	106.8	36 31.8	105.8	37 11.6	104.9	30
20	36 16.5	110.7	36 58.1	109.8	37 39.3	108.8	38 20.1	107.9	39 00.4	107.0	20
10	38 01.7	112.9	38 43.8	111.9	39 25.8	111.0	40 07.1	110.1	40 48.1	109.1	10
3 00	39 45.2	115.1	40 28.1	114.2	41 10.6	113.2	41 52.6	112.3	42 34.3	111.3	3 00
2 50	41 26.8	117.5	42 10.5	116.5	42 53.8	115.6	43 36.6	114.6	44 18.9	113.6	2 50
40	43 06.1	119.9	43 50.7	119.0	44 34.8	118.0	45 18.5	117.1	46 01.7	116.1	40
30	44 42.8	122.5	45 28.4	121.6	46 13.6	120.6	46 58.0	119.7	47 42.2	118.7	30
20	46 16.9	125.2	47 03.5	124.3	47 49.6	123.3	48 35.1	122.3	49 20.3	121.3	20
10	47 47.8	128.0	48 35.3	127.1	49 22.6	126.2	50 09.2	125.2	50 55.5	124.2	10
2 00	49 15.2	131.0	50 03.9	130.1	50 52.2	129.2	51 40.0	128.2	52 27.4	127.2	2 00
1 50	50 38.4	134.2	51 28.4	133.3	52 18.0	132.4	53 07.0	131.5	53 55.7	130.6	1 50
40	51 57.3	137.5	52 48.5	136.7	53 39.2	135.8	54 29.5	134.8	55 19.5	133.9	40
30	53 11.1	141.0	54 03.6	140.2	54 55.6	139.4	55 47.8	138.4	56 38.7	137.5	30
20	54 19.5	144.7	55 13.2	143.9	56 06.4	143.1	56 59.5	142.3	57 52.1	141.4	20
10	55 21.7	148.6	56 16.6	147.9	57 11.4	147.1	58 05.5	146.3	58 59.5	145.5	10
1 00	56 17.4	152.7	57 13.4	152.0	58 09.2	151.3	59 04.8	150.6	60 00.2	149.9	1 00
0 50	57 05.5	157.0	58 02.6	156.4	58 59.7	155.8	59 56.4	155.1	60 53.0	154.4	0 50
40	57 46.0	161.3	58 44.1	160.8	59 42.0	160.3	60 39.9	159.8	61 37.6	159.2	40
30	58 17.9	165.9	59 16.9	165.5	60 15.7	165.1	61 14.7	164.7	62 13.1	164.2	30
20	58 41.2	170.5	59 40.7	170.2	60 40.2	170.0	61 39.6	169.7	62 39.0	169.4	20
10	58 55.3	175.2	59 55.1	175.1	60 55.0	175.0	61 54.8	174.9	62 54.7	174.7	10
0 00	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00					0 17.2	67.5	0 58.3	66.8	1 39.4	66.0	7 00
6 50	0 41.4	70.6	1 21.9	69.8	2 02.4	69.1	2 42.9	68.4	3 23.4	67.6	6 50
40	2 28.6	72.2	3 08.7	71.5	3 48.7	70.7	4 28.8	70.0	5 08.8	69.2	40
30	4 16.9	73.8	4 56.5	73.1	5 36.1	72.3	6 15.6	71.5	6 55.1	70.8	30
20	6 06.1	75.4	6 45.3	74.6	7 24.5	73.9	8 03.5	73.1	8 42.5	72.4	20
10	7 56.0	77.0	8 34.8	76.2	9 13.5	75.4	9 52.2	74.6	10 30.8	73.9	10
6 00	9 46.6	78.6	10 25.1	77.8	11 03.5	77.0	11 41.8	76.2	12 20.0	75.4	6 00
5 50	11 38.1	80.2	12 16.1	79.4	12 54.1	78.6	13 32.0	77.8	14 09.9	77.0	5 50
40	13 29.6	81.7	14 07.5	80.9	14 45.4	80.1	15 23.1	79.3	16 00.6	78.5	40
30	15 21.9	83.3	15 59.7	82.5	16 37.1	81.7	17 14.5	80.9	17 51.7	80.1	30
20	17 14.5	84.9	17 52.0	84.1	18 29.4	83.2	19 06.6	82.4	19 43.5	81.6	20
10	19 07.4	86.5	19 44.9	85.7	20 21.9	84.8	20 58.9	83.9	21 35.7	83.1	10
5 00	21 00.4	88.1	21 37.8	87.3	22 14.9	86.4	22 51.7	85.5	23 28.3	84.7	5 00
4 50	22 53.6	89.7	23 30.9	88.9	24 07.6	88.0	24 44.6	87.1	25 21.1	86.3	4 50
40	24 46.7	91.3	25 24.1	90.5	26 01.1	89.6	26 37.8	88.7	27 14.2	87.8	40
30	26 39.9	93.0	27 17.1	92.2	27 54.2	91.3	28 30.9	90.4	29 07.3	89.4	30
20	28 32.8	94.7	29 10.3	93.9	29 47.4	93.0	30 24.2	92.0	31 00.5	91.1	20
10	30 25.5	96.5	31 03.1	95.6	31 40.3	94.7	32 17.2	93.7	32 53.6	92.8	10
4 00	32 17.7	98.3	32 55.6	97.4	33 33.0	96.4	34 10.0	95.5	34 46.6	94.5	4 00
3 50	34 09.6	100.1	34 47.6	99.2	35 25.2	98.2	36 02.5	97.3	36 39.3	96.3	3 50
40	36 00.7	102.0	36 39.1	101.0	37 17.1	100.1	37 54.6	99.1	38 31.7	98.1	40
30	37 51.0	104.0	38 29.8	103.0	39 08.1	102.0	39 46.1	101.0	40 23.5	100.0	30
20	39 40.3	106.0	40 19.7	105.0	40 58.5	104.0	41 36.9	103.0	42 14.7	101.9	20
10	41 28.7	108.1	42 08.8	107.1	42 47.8	106.1	43 26.6	105.0	44 04.9	104.0	10
3 00	43 15.4	110.3	43 56.0	109.3	44 36.0	108.3	45 15.4	107.2	45 54.3	106.1	3 00
2 50	45 00.8	112.6	45 42.0	111.6	46 22.8	110.5	47 02.9	109.4	47 42.4	108.3	2 50
40	46 44.4	115.1	47 26.4	114.0	48 07.9	112.9	48 48.8	111.8	49 29.1	110.7	40
30	48 25.8	117.6	49 08.8	116.6	49 51.1	115.5	50 33.0	114.3	51 14.1	113.2	30
20	50 04.9	120.3	50 48.9	119.2	51 32.0	118.1	52 15.0	117.0	52 57.1	115.8	20
10	51 41.2	123.2	52 26.2	122.1	53 10.7	121.0	53 54.7	119.9	54 37.9	118.7	10
2 00	53 14.3	126.2	54 00.5	125.1	54 46.2	124.0	55 31.3	122.9	56 15.8	121.7	2 00
1 50	54 43.8	129.5	55 31.1	128.4	56 18.2	127.3	57 04.7	126.1	57 50.4	124.9	1 50
40	56 09.0	132.9	56 57.9	131.8	57 46.1	130.7	58 34.0	129.6	59 21.2	128.4	40
30	57 29.5	136.5	58 19.8	135.5	59 09.7	134.5	59 58.9	133.4	60 47.5	132.3	30
20	58 44.5	140.5	59 36.2	139.5	60 27.6	138.4	61 18.5	137.3	62 08.8	136.2	20
10	59 53.4	144.6	60 46.8	143.7	61 39.5	142.7	62 32.0	141.6	63 24.0	140.5	10
1 00	60 55.3	149.1	61 50.0	148.2	62 44.5	147.3	63 38.6	146.3	64 32.3	145.3	1 00
0 50	61 49.7	153.7	62 45.7	153.0	63 41.5	152.2	64 37.1	151.3	65 32.5	150.4	0 50
40	62 35.2	158.6	63 32.6	158.0	64 29.9	157.3	65 26.9	156.6	66 23.8	155.8	40
30	63 11.8	163.8	64 10.2	163.3	65 08.8	162.8	66 06.9	162.2	67 05.0	161.6	30
20	63 38.4	169.1	64 37.7	168.7	65 36.9	168.3	66 36.1	167.9	67 35.2	167.5	20
10	63 54.5	174.5	64 54.2	174.3	65 54.2	174.1	66 54.0	173.9	67 53.7	173.7	10
0 00	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30									0 10.3	57.6	7 30
20					0 22.1	60.6	1 04.4	59.9	1 46.7	59.2	20
10	0 39.2	63.7	1 20.0	63.0	2 01.5	62.2	2 43.2	61.5	3 24.7	60.7	10
7 00	2 26.5	65.3	3 01.5	64.6	3 42.4	63.8	4 23.4	63.1	5 04.3	62.3	7 00
6 50	4 03.9	66.9	4 44.3	66.1	5 24.6	65.4	6 04.9	64.7	6 45.3	63.9	6 50
40	5 48.7	68.5	6 28.5	67.7	7 08.3	67.0	7 48.0	66.2	8 27.6	65.4	40
30	7 34.4	70.0	8 13.8	69.3	8 53.0	68.5	9 32.1	67.7	10 11.2	67.0	30
20	9 21.4	71.6	10 00.2	70.8	10 38.9	70.0	11 17.4	69.3	11 55.9	68.5	20
10	11 09.3	73.1	11 47.7	72.3	12 25.8	71.5	13 03.8	70.8	13 41.8	70.0	10
6 00	12 58.0	74.6	13 35.9	73.9	14 13.6	73.1	14 51.2	72.2	15 28.6	71.4	6 00
5 50	14 47.6	76.2	15 25.0	75.4	16 02.3	74.5	16 39.4	73.7	17 16.3	72.9	5 50
40	16 37.9	77.7	17 14.9	76.9	17 51.9	76.0	18 28.5	75.2	19 05.0	74.4	40
30	18 28.7	79.2	19 05.5	78.4	19 42.0	77.5	20 18.3	76.7	20 54.3	75.8	30
20	20 20.2	80.7	20 56.7	79.9	21 32.9	79.0	22 08.9	78.2	22 44.6	77.3	20
10	22 12.1	82.2	22 48.4	81.4	23 24.2	80.5	23 59.8	79.7	24 35.2	78.8	10
5 00	24 04.5	83.8	24 40.5	82.9	25 16.2	82.0	25 51.5	81.2	26 26.6	80.2	5 00
4 50	25 57.1	85.3	26 33.0	84.4	27 08.4	83.5	27 43.6	82.7	28 18.2	81.7	4 50
40	27 50.2	86.9	28 25.8	86.0	29 01.1	85.1	29 36.1	84.2	30 10.6	83.2	40
30	29 43.2	88.5	30 18.8	87.6	30 54.0	86 7	31 28.8	85.7	32 03.1	84.7	30
20	31 36.5	90.2	32 12.0	89.2	32 47.1	88.3	33 21.9	87.3	33 56.0	86.3	20
10	33 29.6	91.8	34 05.2	90.8	34 40.2	89.9	35 14.9	88.9	35 48.9	87.9	10
4 00	35 22.7	93.5	35 58.4	92.5	36 33.5	91.5	37 08.2	90.5	37 42.2	89.5	4 00
3 50	37 15.6	95.3	37 51.4	94.3	38 26.7	93.2	39 01.3	92.2	39 35.3	91.1	3 50
40	39 08.2	97.1	39 44.1	96.0	40 19.5	95.0	40 54.4	93.9	41 28.6	92.8	40
30	41 00.2	99.0	41 36.5	97.9	42 12.1	96.8	42 47.2	95.7	43 21.5	94.6	30
20	42 51.8	100.9	43 28.3	99.8	44 04.3	98.7	44 39.7	97.6	45 14.2	96.4	20
10	44 42.6	102.9	45 19.7	101.8	45 55.9	100.6	46 31.5	99.5	47 06.5	98.3	10
3 00	46 32.5	105.0	47 10.0	103.8	47 46.8	102.7	48 22.9	101.5	48 58.2	100.3	3 00
2 50	48 21.2	107.2	48 59.4	106.0	49 36.7	104.9	50 13.4	103.7	50 49.2	102.4	2 50
40	50 08.6	109.5	50 47.4	108.3	51 25.6	107.1	52 02.9	105.9	52 39.4	104.6	40
30	51 54.5	112.0	52 34.2	110.8	53 13.1	109.5	53 51.1	108.2	54 28.2	106.9	30
20	53 38.4	114.6	54 19.0	113.4	54 58.8	112.1	55 37.9	110.7	56 16.0	109.4	20
10	55 20.2	117.5	56 01.9	116.2	56 42.9	114.9	57 22.7	113.5	58 01.7	112.1	10
2 00	56 59.4	120.4	57 42.2	119.1	58 24.3	117.8	59 05.6	116.4	59 45.9	115.0	2 00
1 50	58 35.4	123.7	59 19.6	122.4	60 03.0	121.0	60 45.5	119.6	61 27.0	118.1	1 50
40	60 07.6	127.1	60 53.3	125.8	61 38.3	124.4	62 22.4	123.0	63 05.5	121.5	40
30	61 35.6	131.0	62 23.0	129.7	63 09.5	128.2	63 55.2	126.8	64 40.0	125.3	30
20	62 58.5	135.0	63 47.5	133.7	64 35.9	132.3	65 23.5	130.9	66 10.1	129.4	20
10	64 15.5	139.4	65 06.5	137.0	65 56.5	136.7	66 46.0	135.3	67 34.7	133.9	10
1 00	65 25.4	144.2	66 18.2	143.0	67 10.4	141.8	68 02.0	140.4	68 52.7	139.0	1 00
0 50	66 27.6	149.4	67 22.1	148.3	68 16.2	147.2	69 09.6	145.9	70 02.7	144.6	0 50
40	67 20.4	155.0	68 16.7	154.0	69 12.6	153.0	70 08.3	151.9	71 03.5	150.8	40
30	68 02.9	160.9	69 01.0	160.1	69 58.2	159.3	70 55.7	158.4	71 52.7	157.4	30
20	68 34.3	167.1	69 33.3	166.6	70 32.2	166.0	71 31.0	165.4	72 29.7	164.7	20
10	68 53.7	173.5	69 53.2	173.3	70 53.0	173.0	71 52.7	172.6	72 52.2	172.2	10
0 00	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 53.2	91.6	1 13.8	92.4	0 34.4	93.2					5 50
40	3 46.3	93.3	3 06.8	94.0	2 27.4	94.8	1 47.9	95.6	1 08.3	96.3	40
30	5 39.2	94.9	4 59.6	95.6	4 19.9	96.4	3 40.3	97.2	3 00.6	97.9	30
20	7 31.9	96.6	6 52.1	97.3	6 12.3	98.1	5 32.5	98.9	4 52.5	99.6	20
10	9 24.0	98.3	8 44.2	99.0	8 04.1	99.8	7 24.0	100.5	6 43.8	101.3	10
5 00	11 15.9	100.0	10 35.7	100.7	9 55.4	101.5	9 15.0	102.2	8 34.5	103.0	5 00
4 50	13 07.0	101.7	12 26.6	102.4	11 45.9	103.2	11 05.2	103.9	10 24.4	104.7	4 50
40	14 57.5	103.4	14 16.7	104.2	13 35.8	104.9	12 54.7	105.7	12 13.5	106.4	40
30	16 47.2	105.2	16 05.9	106.0	15 24.8	106.7	14 43.2	107.5	14 01.5	108.2	30
20	18 36.0	107.0	17 54.4	107.8	17 12.6	108.5	16 30.6	109.3	15 48.5	110.0	20
10	20 23.6	108.9	19 41.6	109.7	18 59.2	110.4	18 16.9	111.1	17 34.2	111.8	10
4 00	22 10.2	110.7	21 27.7	111.5	20 44.8	112.3	20 01.8	113.0	19 18.6	113.7	4 00
3 50	23 55.4	112.7	23 12.2	113.4	22 28.8	114.2	21 45.2	114.9	21 01.4	115.6	3 50
40	25 39.1	114.7	24 55.3	115.4	24 11.3	116.2	23 27.1	116.9	22 42.7	117.6	40
30	27 21.0	116.7	26 36.6	117.5	25 52.0	118.2	25 07.1	119.0	24 21.9	119.7	30
20	29 01.2	118.8	28 16.1	119.6	27 30.7	120.3	26 45.1	121.1	25 59.3	121.8	20
10	30 39.3	121.0	29 53.4	121.8	29 07.3	122.5	28 20.9	123.3	27 34.3	124.0	10
3 00	32 15.2	123.3	31 28.5	124.0	30 41.6	124.7	29 54.5	125.5	29 07.1	126.2	3 00
2 50	33 48.5	125.6	33 01.1	126.3	32 13.3	127.0	31 25.3	127.8	30 37.0	128.5	2 50
40	35 19.2	128.0	34 30.9	128.7	33 42.2	129.4	32 53.4	130.1	32 04.3	130.8	40
30	36 46.8	130.5	35 57.6	131.2	35 08.1	131.9	34 18.2	132.6	33 28.2	133.3	30
20	38 11.2	133.2	37 21.0	133.8	36 30.6	134.5	35 39.9	135.2	34 49.0	135.8	20
10	39 31.8	135.9	38 40.8	136.5	37 49.3	137.2	36 57.8	137.9	36 06.0	138.5	10
2 00	40 48.8	138.7	39 56.7	139.2	39 04.3	139.9	38 11.8	140.6	37 19.1	141.2	2 00
1 50	42 01.3	141.6	41 08.3	142.2	40 15.1	142.8	39 21.6	143.4	38 27.9	144.0	1 50
40	43 09.4	144.6	42 15.4	145.2	41 21.2	145.8	40 26.8	146.3	39 32.2	146.9	40
30	44 13.3	147.7	43 17.5	148.3	42 22.4	148.8	41 27.1	149.3	40 31.5	149.8	30
20	45 10.2	151.0	44 14.3	151.5	43 18.3	152.0	42 22.2	152.5	41 25.9	152.9	20
10	46 02.0	154.3	45 05.4	154.8	44 08.6	155.2	43 11.6	155.7	42 14.4	156.1	10
1 00	46 48.1	157.8	45 50.6	158.2	44 52.9	158.6	43 55.2	159.0	42 57.5	159.3	1 00
0 50	47 27.7	161.3	46 29.4	161.7	45 31.1	162.0	44 32.8	162.3	43 34.2	162.6	0 50
40	48 00.5	165.0	47 01.6	165.2	46 02.7	165.5	45 03.8	165.8	44 04.8	166.0	40
30	48 26.4	168.7	47 27.0	168.9	46 27.5	169.1	45 28.2	169.3	44 28.8	169.5	30
20	48 45.0	172.4	47 45.3	172.6	46 45.6	172.7	45 45.9	172.8	44 46.2	173.0	20
10	48 56.2	176.2	47 56.2	176.3	46 56 4	176.3	45 56.4	176.4	44 56.5	176.5	10
0 00	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 28.8	97.0									5 40
30	2 20.8	98.7	1 41.1	99.4	1 01.3	100.2	0 21.5	100.9			30
20	4 12.6	100.4	3 32.5	101.1	2 52.4	101.9	2 12.3	102.6	1 32.3	103.3	20
10	6 03.6	102.0	5 23.2	102.8	4 42.9	103.5	4 02.4	104.3	3 21.9	105.0	10
5 00	7 54.0	103.7	7 13.3	104.5	6 32.6	105.2	5 51.8	106.0	5 10.9	106.7	5 00
4 50	9 43.4	105.4	9 02.4	106.2	8 21.4	106.9	7 40.1	107.7	6 58.8	108.4	4 50
40	11 32.2	107.2	10 50.7	107.9	10 09.1	108.6	9 27.4	109.4	8 45.7	110.1	40
30	13 19.8	108.9	12 37.8	109.7	11 55.8	110.4	11 13.6	111.1	10 31.4	111.9	30
20	15 06.3	110.7	14 23.9	111.5	13 41.3	112.2	12 58.6	112.9	12 15.8	113.7	20
10	16 51.4	112.6	16 08.4	113.3	15 25.4	114.0	14 42.2	114.7	13 58.7	115.5	10
4 00	18 35.3	114.5	17 51.7	115.2	17 08.0	115.9	16 24.2	116.6	15 40.2	117.3	4 00
3 50	20 17.5	116.4	19 33.2	117.1	18 49.0	117.8	18 04.5	118.5	17 19.8	119.2	3 50
40	21 58.1	118.4	21 13.2	119.1	20 28.2	119.8	19 43.0	120.5	18 57.7	121.2	40
30	23 36.7	120.4	22 51.1	121.1	22 05.5	121.8	21 19.5	122.5	20 33.5	123.2	30
20	25 13.2	122.5	24 27.0	123.2	23 40.5	123.9	22 53.9	124.6	22 07.1	125.3	20
10	26 47.6	124.6	26 00.6	125.3	25 13.4	126.0	24 25.9	126.7	23 38.3	127.4	10
3 00	28 19.4	126.8	27 31.6	127.5	26 43.6	128.2	25 55.4	128.9	25 07.1	129.5	3 00
2 50	29 48.7	129.1	29 00.1	129.8	28 11.2	130.5	27 22.1	131.1	26 32.8	131.7	2 50
40	31 15.0	131.5	30 25.5	132.2	29 35.8	132.8	28 45.9	133.4	27 55.8	134.0	40
30	32 38.2	134.0	31 47.8	134.6	30 57.2	135.2	30 06.4	135.8	29 15.5	136.4	30
20	33 57.9	136.5	33 06.7	137.1	32 15.2	137.7	31 23.5	138.3	30 31.7	138.9	20
10	35 14.1	139.1	34 21.9	139.7	33 29.5	140.3	32 36.9	140.8	31 44.3	141.4	10
2 00	36 26.2	141.8	35 33.2	142.3	34 39.9	142.9	33 46.5	143.4	32 53.0	144.0	2 00
1 50	37 34.1	144.6	36 40.2	145.1	35 46.1	145.6	34 51.8	146.1	33 57.4	146.6	1 50
40	38 37.5	147.4	37 42.7	147.9	36 47.7	148.4	35 52.6	148.9	34 57.3	149.4	40
30	39 36.0	150.3	38 40.3	150.8	37 44.6	151.3	36 48.6	151.7	35 52.6	152.2	30
20	40 29.5	153.4	39 33.0	153.8	38 36.4	154.3	37 39.7	154.7	36 42.9	155.1	20
10	41 17.3	156.5	40 20.1	156.9	39 22.8	157.3	38 25.5	157.7	37 27.9	158.0	10
1 00	41 59.6	159.7	41 01.7	160.0	40 03.7	160.4	39 05.6	160.7	38 07.5	161.0	1 00
0 50	42 35.8	162.9	41 37.2	163.2	40 38.7	163.5	39 40.1	163.8	38 41.5	164.1	50
40	43 05.8	166.3	42 06.8	166.5	41 07.7	166.8	40 08.7	167.0	39 09.5	167.2	40
30	43 29.5	169.7	42 29.9	169.8	41 30.5	170.0	40 31.0	170.2	39 31.5	170.4	30
20	43 46.4	173.1	42 46.7	173.2	41 46.8	173.3	40 47.1	173.5	39 47.3	173.6	20
10	43 56.6	176.5	42 56.6	176.6	41 56.7	176.6	40 56.8	176.7	39 56.8	176.8	10
0 00	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 52.1	104.1	0 12.0	104.8							5 20
10	2 41.4	105.8	2 01.0	106.5	1 20.5	107.2	0 39.9	107.9			10
5 00	4 30.0	107.4	3 49.0	108.1	3 08.0	108.9	2 27.0	109.6	1 46.0	110.3	5 00
4 50	6 17.5	109.1	5 36.0	109.8	4 54.7	110.6	4 13.1	111.3	3 31.6	112.0	4 50
40	8 03.8	110.8	7 22.0	111.5	6 40.0	112.3	5 58.0	113.0	5 15.8	113.7	40
30	9 49.0	112.6	9 06.6	113.3	8 24.1	114.0	7 41.4	114.7	6 58.8	115.4	30
20	11 32.8	114.4	10 49.9	115.1	10 06.7	115.8	9 23.6	116.5	8 40.3	117.2	20
10	13 15.3	116.2	12 31.6	116.9	11 47.9	117.6	11 04.1	118.3	10 20.1	119.0	10
4 00	14 56.0	118.0	14 11.8	118.7	13 27.4	119.4	12 42.9	120.1	11 58.3	120.8	4 00
3 50	16 35.1	119.9	15 50.2	120.6	15 05.2	121.3	14 19.8	122.0	13 34.6	122.7	3 50
40	18 12.2	121.9	17 26.6	122.6	16 40.8	123.2	15 54.9	123.9	15 08.9	124.6	40
30	19 47.3	123.9	19 00.9	124.6	18 14.4	125.2	17 27.8	125.9	16 41.0	126.5	30
20	21 20.1	125.9	20 33.0	126.6	19 45.7	127.2	18 58.4	127.9	18 10.8	128.5	20
10	22 50.6	128.0	22 02.6	128.7	21 14.6	129.3	20 26.4	130.0	19 38.1	130.6	10
3 00	24 18.5	130.2	23 29.7	130.8	22 40.8	131.4	21 51.8	132.1	21 02.6	132.7	3 00
2 50	25 43.6	132.4	24 53.9	133.0	24 04.3	133.6	23 14.3	134.3	22 24.4	134.9	2 50
40	27 05.5	134.7	26 15.2	135.3	25 24.6	135.9	24 34.0	136.5	23 43.1	137.1	40
30	28 24.4	137.0	27 33.2	137.6	26 41.8	138.2	25 50.1	138.8	24 58.7	139.3	30
20	29 39.8	139.5	28 47.7	140.0	27 55.5	140.6	27 03.1	141.2	26 10.6	141.7	20
10	30 51.5	142.0	29 58.5	142.5	29 05.5	143.0	28 12.2	143.6	27 19.0	144.1	10
2 00	31 59.3	144.5	31 05.5	145.0	30 11.6	145.5	29 17.6	146.0	28 23.3	146.5	2 00
1 50	33 02.8	147.1	32 08.2	147.6	31 13.6	148.1	30 18.7	148.6	29 23.8	149.0	1 50
40	34 02.0	149.9	33 06.6	150.3	32 11.0	150.8	31 15.4	151.2	30 19.7	151.6	40
30	34 56.5	152.6	34 00.2	153.1	33 04.0	153.5	32 07.7	153.9	31 11.2	154.3	30
20	35 46.1	155.5	34 49.1	155.9	33 52.1	156.2	32 55.0	156.6	31 57.9	157.0	20
10	36 30.4	158.4	35 32.8	158.7	34 35.2	159.0	33 37.4	159.4	32 39.8	159.7	10
1 00	37 09.4	161.3	36 11.2	161.6	35 12.9	161.9	34 14.6	162.2	33 16.3	162.5	1 00
0 50	37 42.7	164.4	36 44.0	164.6	35 45.4	164.9	34 46.4	165.1	33 47.7	165.3	0 50
40	38 10.4	167.4	37 11.2	167.6	36 11.9	167.9	35 12.7	168.1	34 13.4	168.2	40
30	38 32.0	170.5	37 32.4	170.7	36 32.9	170.9	35 33.2	171.0	34 33.8	171.1	30
20	38 47.5	173.7	37 47.7	173.8	36 47.9	173.9	35 48.1	174.0	34 48.3	174.1	20
10	38 56.9	176.8	37 56.9	176.9	36 57.0	176.9	35 57.0	177.0	34 57.1	177.0	10
0 00	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 05.0	111.1	0 23.9	111.8							5 00
4 50	2 49.9	112.7	2 08.3	113.4	1 26.7	114.2	0 45.0	114.9	0 03.4	115.6	4 50
40	4 33.7	114.4	3 51.5	115.1	3 09.3	115.8	2 27.0	116.6	1 44.8	117.3	40
30	6 16.1	116.1	5 33.2	116.8	4 50.4	117.5	4 07.5	118.3	3 24.7	118.9	30
20	7 56.9	117.9	7 13.5	118.6	6 30.1	119.3	5 46.5	120.0	5 02.9	120.6	20
10	9 36.1	119.7	8 52.1	120.4	8 07.9	121.0	7 23.7	121.7	6 39.3	122.4	10
4 00	11 13.6	121.5	10 28.8	122.2	9 44.0	122.8	8 59.0	123.5	8 14.0	124.2	4 00
3 50	12 49.2	123.3	12 03.7	124.0	11 18.1	124.6	10 32.4	125.3	9 46.6	126.0	3 50
40	14 22.7	125.2	13 36.4	125.9	12 50.1	126.5	12 03.7	127.2	11 17.2	127.8	40
30	15 54.1	127.2	15 07.1	127.8	14 19.9	128.4	13 32.8	129.1	12 45.4	129.7	30
20	17 23.1	129.2	16 35.3	129.8	15 47.4	130.4	14 59.4	131.0	14 11.3	131.7	20
10	18 49.7	131.2	18 01.0	131.8	17 12.2	132.4	16 23.5	133.0	15 34.5	133.6	10
3 00	20 13.4	133.3	19 24.0	133.9	18 34.5	134.5	17 44.8	135.1	16 55.1	135.7	3 00
2 50	21 34.3	135.4	20 44.1	136.0	19 53.7	136.6	19 03.2	137.2	18 12.7	137.8	2 50
40	22 52.2	137.6	22 01.1	138.2	21 09.9	138.8	20 18.6	139.3	19 27.2	139.9	40
30	24 06.8	139.8	23 14.9	140.4	22 22.8	141.0	21 30.8	141.5	20 38.6	142.1	30
20	25 18.0	142.2	24 25.2	142.7	23 32.4	143.3	22 39.5	143.8	21 46.4	144.3	20
10	26 25.6	144.6	25 31.9	145.1	24 38.2	145.6	23 44.6	146.1	22 50.7	146.6	10
2 00	27 29.1	147.0	26 34.8	147.5	25 40.4	148.0	24 45.9	148.4	23 51.2	148.9	2 00
1 50	28 28.2	149.5	27 33.5	150.0	26 38.4	150.4	25 43.1	150.8	24 47.7	151.3	1 50
40	29 23.9	152.1	28 28.0	152.5	27 32.1	152.9	26 36.1	153.3	25 40.0	153.7	40
30	30 14.8	154.7	29 18.1	155.1	28 21.5	155.4	27 24.8	155.8	26 28.0	156.2	30
20	31 00.7	157.3	30 03.5	157.7	29 06.2	158.0	28 08.9	158.4	27 11.5	158.7	20
10	31 41.9	160.0	30 44.1	160.4	29 46.2	160.7	28 48.2	161.0	27 50.2	161.3	10
1 00	32 18.0	162.8	31 19.6	163.1	30 21.2	163.3	29 22.7	163.6	28 24.2	163.9	1 00
0 50	32 48.8	165.6	31 49.9	165.8	30 51.0	166.0	29 52.1	166.3	28 53.2	166.5	0 50
40	33 14.2	168.4	32 14.9	168.6	31 15.7	168.8	30 16.4	169.0	29 17.1	169.2	40
30	33 34.2	171.2	32 34.7	171.4	31 35.1	171.6	30 35.4	171.7	29 35.8	171.8	30
20	33 48.5	174.2	32 48.7	174.3	31 48.9	174.4	30 49.1	174.5	29 49.2	174.6	20
10	33 57.1	177.1	32 57.1	177.1	31 57.2	177.2	30 57.2	177.2	29 57.3	177.3	10
0 00	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	1 02. 5	118. 0	0 20. 2	118. 7							4 40
30	2 41. 6	119. 6	1 58. 7	120. 3	1 15. 7	121. 0	0 32. 7	121. 7			30
20	4 19. 3	121. 3	3 35. 6	122. 0	2 51. 9	122. 7	2 08. 1	123. 4	1 24. 4	124. 1	20
10	5 54. 9	123. 0	5 10. 6	123. 7	4 26. 1	124. 4	3 41. 7	125. 1	2 57. 2	125. 8	10
4 00	7 28. 9	124. 8	6 43. 8	125. 5	5 58. 6	126. 2	5 13. 3	126. 8	4 28. 1	127. 5	4 00
3 50	9 00. 7	126. 6	8 14. 9	127. 3	7 28. 9	127. 9	6 42. 9	128. 6	5 56. 8	129. 2	3 50
40	10 30. 6	128. 5	9 43. 9	129. 1	8 57. 2	129. 7	8 10. 3	130. 4	7 23. 4	131. 0	40
30	11 58. 0	130. 4	11 10. 6	131. 0	10 22. 9	131. 6	9 35. 3	132. 2	8 47. 6	132. 8	30
20	13 23. 1	132. 3	12 34. 8	132. 9	11 46. 4	133. 5	10 58. 0	134. 1	10 09. 4	134. 7	20
10	14 45. 5	134. 2	13 56. 4	134. 8	13 07. 2	135. 4	12 17. 8	136. 0	11 28. 6	136. 6	10
3 00	16 05. 2	136. 2	15 15. 3	136. 8	14 25. 3	137. 4	13 35. 2	138. 0	12 45. 0	138. 6	3 00
2 50	17 22. 0	138. 3	16 31. 3	138. 9	15 40. 4	139. 4	14 49. 5	140. 0	13 58. 4	140. 5	2 50
40	18 35. 7	140. 4	17 44. 2	141. 0	16 52. 5	141. 5	16 00. 8	142. 0	15 09. 0	142. 5	40
30	19 46. 2	142. 6	18 53. 8	143. 1	18 01. 3	143. 6	17 08. 8	144. 1	16 16. 1	144. 6	30
20	20 53. 3	144. 8	20 00. 1	145. 3	19 06. 9	145. 7	18 13. 5	146. 2	17 20. 0	146. 7	20
10	21 56. 8	147. 0	21 02. 7	147. 5	20 08. 7	147. 9	19 14. 6	148. 4	18 20. 3	148. 9	10
2 00	22 56. 6	149. 3	22 01. 8	149. 8	21 06. 9	150. 2	20 12. 9	150. 6	19 17. 0	151. 1	2 00
1 50	23 52. 2	151. 7	22 56. 8	152. 1	22 01. 2	152. 5	21 05. 6	152. 9	20 09. 8	153. 3	1 50
40	24 43. 8	154. 1	23 47. 7	154. 5	22 51. 4	154. 8	21 55. 1	155. 2	20 58. 8	155. 6	40
30	25 31. 2	156. 5	24 34. 3	156. 9	23 37. 5	157. 2	22 40. 5	157. 5	21 43. 5	157. 9	30
20	26 14. 0	159. 0	25 16. 6	159. 3	24 19. 0	159. 6	23 21. 5	159. 9	22 23. 9	160. 3	20
10	26 52. 2	161. 5	25 54. 3	161. 8	24 56. 2	162. 1	23 58. 1	162. 4	23 00. 0	162. 7	10
1 00	27 25. 7	164. 1	26 27. 2	164. 3	25 28. 6	164. 6	24 30. 1	164. 8	23 31. 4	165. 1	1 00
0 50	27 54. 2	166. 7	26 55. 3	166. 9	25 56. 3	167. 1	24 57. 2	167. 3	23 58. 2	167. 5	0 50
40	28 17. 8	169. 3	27 18. 5	169. 5	26 19. 2	169. 6	25 19. 8	169. 8	24 20. 5	170. 0	40
30	28 36. 1	171. 9	27 36. 7	172. 1	26 36. 9	172. 2	25 37. 3	172. 2	24 37. 7	172. 5	30
20	28 49. 4	174. 6	27 49. 6	174. 7	26 49. 8	174. 8	25 49. 9	174. 9	24 50. 1	175. 0	20
10	28 57. 3	177. 3	27 57. 4	177. 4	26 57. 5	177. 4	25 57. 5	177. 4	24 57. 5	177. 5	10
0 00	29 0. 0	180. 0	28 0. 0	180. 0	27 0. 0	180. 0	26 0. 0	180. 0	25 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 09.1	86.1	0 49.3	85.4	6 10
6 00	0 00.0	90.0	0 40.2	89.3	1 20.3	88.5	2 00.5	87.8	2 40.6	87.0	6 00
5 50	1 51.5	91.6	2 31.7	90.9	3 11.8	90.2	3 51.9	89.4	4 31.9	88.7	5 50
40	3 42.8	93.3	4 23.1	92.6	5 03.3	91.9	5 43.4	91.1	6 23.5	90.4	40
30	5 34.0	95.0	6 14.4	94.3	6 54.5	93.5	7 34.7	92.8	8 14.8	92.0	30
20	7 24.9	96.7	8 05.4	96.0	8 45.7	95.2	9 26.0	94.5	10 06.2	93.7	20
10	9 15.4	98.4	9 56.0	97.7	10 36.4	96.9	11 16.9	96.2	11 57.3	95.4	10
5 00	11 05.4	100.2	11 46.3	99.4	12 27.0	98.7	13 07.6	97.9	13 48.1	97.2	5 00
4 50	12 54.8	101.9	13 35.9	101.2	14 16.9	100.4	14 57.8	99.6	15 38.5	98.9	4 50
40	14 43.4	103.7	15 24.9	103.0	16 06.2	102.2	16 47.4	101.4	17 28.4	100.7	40
30	16 31.4	105.5	17 13.1	104.8	17 54.8	104.0	18 36.2	103.2	19 17.5	102.5	30
20	18 18.3	107.3	19 00.5	106.6	19 42.5	105.8	20 24.4	105.0	21 06.0	104.3	20
10	20 04.0	109.2	20 46.8	108.5	21 29.2	107.7	22 11.5	106.9	22 53.5	106.2	10
4 00	21 48.8	111.1	22 31.9	110.4	23 14.9	109.6	23 57.6	108.9	24 40.1	108.1	4 00
3 50	23 32.0	113.1	24 15.7	112.4	24 59.2	111.6	25 42.4	110.8	26 25.5	110.0	3 50
40	25 13.8	115.1	25 58.1	114.4	26 42.1	113.6	27 26.0	112.9	28 09.5	112.1	40
30	26 53.8	117.2	27 38.8	116.5	28 23.4	115.7	29 07.8	115.0	29 52.0	114.2	30
20	28 32.1	119.3	29 17.7	118.6	30 03.0	117.8	30 48.1	117.1	31 32.9	116.3	20
10	30 08.1	121.5	30 54.5	120.8	31 40.5	120.0	32 26.3	119.3	33 11.8	118.5	10
3 00	31 42.0	123.8	32 29.1	123.1	33 15.9	122.3	34 02.5	121.6	34 48.8	120.8	3 00
2 50	33 13.4	126.2	34 01.1	125.5	34 48.8	124.7	35 36.2	124.0	36 23.3	123.2	2 50
40	34 42.0	128.6	35 30.7	127.9	36 19.2	127.1	37 07.4	126.4	37 55.3	125.6	40
30	36 07.6	131.1	36 57.2	130.4	37 46.5	129.7	38 35.6	129.0	39 24.5	128.2	30
20	37 29.9	133.7	38 20.4	133.0	39 10.7	132.3	40 00.8	131.6	40 50.5	130.9	20
10	38 48.6	136.4	39 40.0	135.7	40 31.2	135.1	41 22.2	134.4	42 12.9	133.6	10
2 00	40 03.6	139.2	40 56.0	138.6	41 48.1	137.9	42 40.1	137.2	43 31.7	136.5	2 00
1 50	41 14.2	142.1	42 07.4	141.5	43 00.6	140.9	43 53.4	140.3	44 46.2	139.6	1 50
40	42 20.4	145.1	43 14.6	144.6	44 08.7	143.9	45 02.6	143.3	45 56.2	142.7	40
30	43 21.5	148.3	44 16.7	147.8	45 11.7	147.1	46 06.5	146.6	47 01.1	146.0	30
20	44 17.6	151.5	45 13.6	151.0	46 09.6	150.4	47 05.3	149.9	48 00.9	149.3	20
10	45 07.9	154.8	46 04.8	154.3	47 01.5	153.8	47 58.2	153.3	48 54.8	152.9	10
1 00	45 52.5	158.2	46 50.1	157.8	47 47.7	157.3	48 45.2	156.9	49 42.5	156.5	1 00
0 50	46 30.8	161.7	47 29.1	161.3	48 27.3	160.9	49 25.4	160.6	50 23.6	160.2	0 50
40	47 02.5	165.2	48 01.4	165.0	49 00.3	164.7	49 59.1	164.4	50 57.9	164.0	40
30	47 27.5	168.9	48 26.8	168.7	49 26.2	168.4	50 25.5	168.1	51 24.9	167.8	30
20	47 45.5	172.6	48 45.3	172.4	49 45.0	172.3	50 44.7	172.1	51 44.4	171.9	20
10	47 56.4	176.3	48 56.2	176.2	49 56.2	176.1	50 56.1	176.0	51 56.1	175.9	10
0 00	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30									0 30.5	78.4	6 30
20			0 19.0	82.2	0 59.3	81.5	1 39.7	80.7	2 20.0	80.0	20
10	1 29.6	84.6	2 09.7	83.9	2 49.9	83.1	3 30.0	82.4	4 10.1	81.6	10
6 00	3 20.7	86.3	4 00.7	85.6	4 40.7	84.8	5 20.6	84.1	6 00.5	83.3	6 00
5 50	5 12.0	88.0	5 51.9	87.2	6 30.2	86.5	7 11.7	85.7	7 51.4	84.9	5 50
40	7 03.5	89.6	7 43.4	88.9	8 23.2	88.1	9 02.9	87.4	9 42.6	86.6	40
30	8 54.9	91.3	9 34.8	90.5	10 14.6	89.8	10 54.3	89.0	11 33.9	88.2	30
20	10 46.3	93.0	11 26.2	92.2	12 06.1	91.5	12 45.8	90.7	13 25.4	89.9	20
10	12 37.6	94.7	13 17.6	93.9	13 57.4	93.2	14 37.3	92.4	15 16.9	91.6	10
5 00	14 28.4	96.4	15 08.6	95.6	15 48.7	94.9	16 28.5	94.1	17 08.2	93.3	5 00
4 50	16 19.0	98.1	16 59.4	97.3	17 39.6	96.6	18 19.6	95.8	18 59.4	95.0	4 50
40	18 09.1	99.9	18 49.7	99.1	19 30.1	98.3	20 10.2	97.5	20 50.2	96.8	40
30	19 58.6	101.7	20 39.4	100.9	21 20.2	100.1	22 00.6	99.3	22 40.8	98.5	30
20	21 47.4	103.5	22 28.6	102.7	23 09.5	101.9	23 50.2	101.1	24 30.7	100.3	20
10	23 35.3	105.4	24 16.8	104.6	24 58.2	103.8	25 39.2	103.0	26 20.0	102.2	10
4 00	25 22.3	107.3	26 04.3	106.5	26 46.0	105.7	27 27.4	104.9	28 08.6	104.1	4 00
3 50	27 08.2	109.3	27 50.6	108.5	28 32.8	107.7	29 14.8	106.8	29 56.2	106.0	3 50
40	28 52.8	111.3	29 35.7	110.5	30 18.4	109.7	31 00.8	108.8	31 42.9	108.0	40
30	30 34.9	113.4	31 19.4	112.5	32 02.6	111.7	32 45.6	110.9	33 28.2	110.1	30
20	32 17.4	115.5	33 01.6	114.7	33 45.5	113.9	34 29.0	113.0	35 12.2	112.2	20
10	33 57.1	117.7	34 41.9	116.9	35 26.5	116.1	36 10.7	115.3	36 54.6	114.4	10
3 00	35 34.7	120.0	36 20.4	119.2	37 05.7	118.4	37 50.6	117.6	38 35.2	116.7	3 00
2 50	37 10.0	122.4	37 56.4	121.6	38 42.6	120.8	39 28.3	120.0	40 13.7	119.1	2 50
40	38 42.9	124.9	39 30.2	124.1	40 17.1	123.3	41 03.7	122.4	41 49.9	121.6	40
30	40 12.9	127.4	41 01.1	126.6	41 49.0	125.8	42 36.5	125.0	43 23.6	124.2	30
20	41 39.9	130.1	42 29.0	129.3	43 17.7	128.5	44 06.1	127.7	44 54.2	126.9	20
10	43 03.3	132.9	43 53.4	132.2	44 43.2	131.4	45 32.7	130.6	46 21.8	129.8	10
2 00	44 23.1	135.8	45 14.1	135.1	46 05.0	134.3	46 55.4	133.5	47 45.6	132.7	2 00
1 50	45 38.6	138.9	46 30.7	138.2	47 22.6	137.4	48 14.2	136.6	49 05.4	135.8	1 50
40	46 49.6	142.0	47 42.8	141.3	48 35.7	140.6	49 28.3	139.9	50 20.6	139.1	40
30	47 55.7	145.4	48 49.8	144.7	49 43.9	144.0	50 37.6	143.3	51 31.2	142.6	30
20	48 56.3	148.8	49 51.5	148.2	50 46.6	147.5	51 41.4	146.9	52 36.0	146.2	20
10	49 51.1	152.3	50 47.3	151.8	51 43.3	151.2	52 39.2	150.6	53 35.0	150.0	10
1 00	50 39.7	156.0	51 36.8	155.5	52 33.8	155.0	53 30.6	154.5	54 27.3	153.9	1 00
0 50	51 21.7	159.8	52 19.5	159.4	53 17.4	158.9	54 15.1	158.5	55 12.8	158.0	0 50
40	51 56.6	162.7	52 55.2	163.4	53 53.8	163.0	54 52.3	162.6	55 50.7	162.2	40
30	52 24.2	167.6	53 23.3	167.4	54 22.4	167.1	55 21.6	166.8	56 20.4	166.5	30
20	52 44.0	171.8	53 43.7	171.6	54 43.2	171.4	55 42.8	171.2	56 42.4	171.0	20
10	52 56.0	175.9	53 55.9	175.8	54 55.9	175.7	55 55.7	175.6	56 55.6	175.5	10
0 00	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

6° 31′ 9

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 20.0	71.3	6 50
40			0 03.4	75.2	0 44.3	74.4	1 25.2	73.7	2 06.0	73.0	40
30	1 11.1	77.6	1 51.6	76.8	2 32.1	76.1	3 12.7	75.4	3 53.1	74.6	30
20	3 00.3	79.3	3 40.6	78.5	4 20.8	77.8	5 01.0	77.0	5 41.1	76.3	20
10	4 50.1	80.9	5 30.1	80.1	6 10.3	79.4	6 49.9	78.6	7 29.7	77.9	10
6 00	6 40.4	82.5	7 20.1	81.8	7 59.8	81.0	8 39.4	80.3	9 18.9	79.5	6 00
5 50	8 31.1	84.1	9 10.7	83.4	9 50.2	82.6	10 29.6	81.9	11 08.9	81.1	5 50
40	10 22.1	85.8	11 01.6	85.1	11 40.9	84.3	12 20.1	83.5	12 59.2	82.7	40
30	12 13.4	87.4	12 52.7	86.7	13 31.9	85.9	14 11.1	85.1	14 50.0	84.3	30
20	14 04.8	89.1	14 44.1	88.4	15 23.2	87.6	16 02.2	86.8	16 41.0	86.0	20
10	15 56.3	90.8	16 35.6	90.0	17 14.7	89.2	17 53.7	88.4	18 32.3	87.6	10
5 00	17 47.7	92.5	18 27.1	91.7	19 06.2	90.9	19 45.1	90.1	20 23.8	89.3	5 00
4 50	19 39.0	94.2	20 18.3	93.4	20 57.5	92.6	21 36.5	91.8	22 15.1	91.0	4 50
40	21 30.0	96.0	22 09.5	95.1	22 48.8	94.3	23 27.8	93.5	24 06.6	92.7	40
30	23 20.8	97.7	24 00.4	96.9	24 39.8	96.1	25 19.0	95.2	25 57.8	94.4	30
20	25 10.9	99.5	25 50.9	98.7	26 30.5	97.8	27 09.8	97.0	27 48.9	96.1	20
10	27 00.5	101.3	27 40.8	100.5	28 20.6	99.6	29 00.2	98.8	29 39.5	97.9	10
4 00	28 49.4	103.2	29 30.0	102.4	30 10.2	101.5	30 50.1	100.7	31 29.6	99.8	4 00
3 50	30 37.4	105.2	31 18.4	104.3	31 59.0	103.4	32 39.3	102.6	33 19.3	101.7	3 50
40	32 24.6	107.2	33 06.0	106.3	33 47.0	105.4	34 27.6	104.5	35 07.9	103.6	40
30	34 10.4	109.2	34 52.4	108.3	35 34.0	107.5	36 15.1	106.6	36 55.8	105.7	30
20	35 55.1	111.3	36 37.5	110.5	37 19.6	109.6	38 01.3	108.7	38 42.6	107.7	20
10	37 38.1	113.5	38 21.2	112.7	39 04.0	111.8	39 46.2	110.8	40 28.1	109.9	10
3 00	39 19.4	115.8	40 03.2	114.9	40 46.5	114.0	41 29.5	113.1	42 12.1	112.2	3 00
2 50	40 58.7	118.2	41 43.3	117.3	42 27.5	116.4	43 11.2	115.5	43 54.5	114.5	2 50
40	42 35.8	120.7	43 21.2	119.8	44 06.2	118.9	44 50.7	117.9	45 34.9	117.0	40
30	44 10.3	123.3	44 56.6	122.4	45 42.5	121.5	46 28.1	120.6	47 13.1	119.6	30
20	45 42.0	126.0	46 29.3	125.1	47 16.2	124.2	48 02.6	123.3	48 48.7	122.3	20
10	47 10.5	128.9	47 58.8	128.0	48 46.9	127.1	49 34.3	126.2	50 21.4	125.2	10
2 00	48 35.4	131.9	49 24.9	131.0	50 13.9	130.1	51 02.5	129.2	51 50.7	128.3	2 00
1 50	49 56.3	135.0	50 46.9	134.2	51 37.1	133.3	52 26.9	132.4	53 16.2	131.5	1 50
40	51 12.7	138.4	52 04.5	137.6	52 55.8	136.7	53 46.8	135.8	54 37.5	134.9	40
30	52 24.3	141.9	53 17.2	141.1	54 09.7	140.3	55 02.1	139.4	55 54.0	138.5	30
20	53 30.3	145.5	54 24.4	144.8	55 18.2	144.0	56 11.7	143.2	57 04.9	142.4	20
10	54 30.4	149.3	55 25.6	148.7	56 20.6	148.0	57 15.4	147.2	58 09.9	146.4	10
1 00	55 23.9	153.3	56 20.2	152.7	57 16.4	152.1	58 12.3	151.4	59 08.1	150.7	1 00
0 50	56 10.1	157.5	57 07.6	166.9	58 04.9	156.4	59 02.0	155.8	59 58.8	155.1	0 50
40	56 49.0	161.8	57 47.3	161.4	58 45.4	160.9	59 43.5	160.4	60 41.4	159.9	40
30	57 19.7	166.2	58 18.7	165.9	59 17.6	165.5	60 16.5	165.1	61 15.4	164.6	30
20	57 42.0	170.8	58 41.5	170.5	59 41.0	170.3	60 40.5	170.0	61 40.0	169.7	20
10	57 55.4	175.4	58 55.3	175.2	59 55.1	175.1	60 55.2	175.0	61 55.0	174.8	10
0 00	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10									0 22.5	64.4	7 10
7 00					0 40.2	67.5	1 22.0	66.8	2 03.8	66.1	7 00
6 50	1 01.3	70.6	1 42.6	69.9	2 23.8	69.2	3 05.1	68.5	3 46.3	67.7	6 50
40	2 46.9	72.3	3 27.7	71.5	4 08.5	70.8	4 49.3	70.1	5 30.0	69.3	40
30	4 33.6	73.9	5 14.0	73.1	5 54.2	72.4	6 34.5	71.7	7 14.8	70.9	30
20	6 21.1	75.5	7 01.1	74.8	7 41.0	74.0	8 20.9	73.3	9 00.6	72.5	20
10	8 09.5	77.1	8 49.1	76.4	9 28.5	75.6	10 08.0	74.8	10 47.3	74.1	10
6 00	9 58.4	78.7	10 37.7	78.0	11 16.9	77.2	11 56.0	76.4	12 35.0	75.7	6 00
5 50	11 47.9	80.3	12 27.1	79.6	13 05.9	78.8	13 44.7	78.0	14 23.3	77.2	5 50
40	13 38.1	82.0	14 16.9	81.2	14 55.6	80.4	15 34.0	79.6	16 12.4	78.8	40
30	15 28.7	83.6	16 07.4	82.8	16 45.7	82.0	17 23.9	81.2	18 01.9	80.4	30
20	17 19.7	85.2	17 58.1	84.4	18 36.3	83.6	19 14.3	82.8	19 52.1	81.9	20
10	19 10.9	86.8	19 49.1	86.0	20 27.2	85.2	21 05.1	84.4	21 42.7	83.5	10
5 00	21 02.2	88.5	21 40.4	87.6	22 18.4	86.8	22 56.1	86.0	23 33.6	85.1	5 00
4 50	22 53.7	90.1	23 31.9	89.3	24 09.7	88.4	24 47.3	87.6	25 24.7	86.7	4 50
40	24 45.1	91.8	25 23.3	91.0	26 01.2	90.1	26 38.8	89.2	27 16.2	88.4	40
30	26 36.5	93.5	27 14.8	92.7	27 52.7	91.8	28 30.2	90.9	29 07.6	90.0	30
20	28 27.6	95.3	29 06.0	94.4	29 44.0	93.5	30 21.7	92.6	30 59.0	91.7	20
10	30 18.4	97.1	30 57.0	96.2	31 35.1	95.3	32 13.0	94.4	32 50.3	93.4	10
4 00	32 08.8	98.9	32 47.6	98.0	33 26.0	97.1	34 03.9	96.2	34 41.5	95.2	4 00
3 50	33 58.6	100.8	34 37.8	99.8	35 16.4	98.9	35 54.7	98.0	36 32.5	97.0	3 50
40	35 47.8	102.7	36 27.2	101.8	37 06.2	100.8	37 44.7	99.9	38 22.8	98.9	40
30	37 36.1	104.7	38 16.0	103.8	38 55.4	102.8	39 34.1	101.8	40 12.7	100.8	30
20	39 23.5	106.8	40 03.8	105.9	40 43.6	104.9	41 23.1	103.8	42 01.8	102.8	20
10	41 09.5	108.9	41 50.4	108.0	42 30.7	107.0	43 10.7	106.0	43 50.0	104.9	10
3 00	42 54.2	111.2	43 35.7	110.2	44 16.7	109.2	44 57.2	108.2	45 37.1	107.1	3 00
2 50	44 37.1	113.5	45 19.6	112.5	46 01.1	111.5	46 42.4	110.5	47 23.0	109.4	2 50
40	46 18.5	116.0	47 01.5	115.0	47 44.0	113.9	48 25.9	112.9	49 07.3	111.8	40
30	47 57.4	118.6	48 41.6	117.6	49 24.9	116.5	50 07.7	115.5	50 49.9	114.4	30
20	49 34.2	121.3	50 19.1	120.3	51 02.9	119.2	51 47.2	118.1	52 30.4	117.0	20
10	51 07.9	124.2	51 53.9	123.2	52 39.4	122.1	53 24.2	121.0	54 08.5	119.9	10
2 00	52 38.4	127.3	53 25.5	126.3	54 12.1	125.2	54 58.2	124.1	55 43.7	122.9	2 00
1 50	54 05.1	130.5	54 53.7	129.5	55 41.4	128.4	56 28.8	127.3	57 15.4	126.2	1 50
40	55 27.7	133.9	56 17.4	132.9	57 06.5	131.9	57 55.2	130.8	58 43.3	129.7	40
30	56 45.5	137.6	57 36.7	136.6	58 27.1	135.6	59 17.2	134.6	60 06.7	133.5	30
20	57 57.8	141.5	58 50.2	140.6	59 42.2	139.6	60 33.8	138.6	61 25.0	137.6	20
10	59 04.1	145.6	59 58.0	144.8	60 51.4	143.9	61 44.5	142.9	62 37.2	141.9	10
1 00	60 03.6	150.0	60 58.8	149.2	61 53.7	148.3	62 48.3	147.4	63 42.5	146.5	1 00
0 50	60 55.5	154.5	61 52.4	153.8	62 48.2	153.1	63 44.2	152.3	64 40.0	151.5	0 50
40	61 39.2	159.3	62 36.9	158.7	63 34.4	158.1	64 31.7	157.4	65 28.8	156.8	40
30	62 14.0	164.2	63 12.8	163.8	64 11.2	163.3	65 09.5	162.8	66 08.1	162.3	30
20	62 39.4	169.4	63 38.8	169.1	64 38.1	168.8	65 37.3	168.4	66 36.5	168.1	20
10	62 54.8	174.7	63 54.8	174.5	64 54.4	174.3	65 54.2	174.1	66 54.1	173.9	10
0 00	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30									0 42.6	57.6	7 30
20			0 08.6	61.3	0 51.6	60.6	1 34.5	59.9	2 17.4	59.2	20
10	1 04.7	63.7	1 47.2	63.0	2 29.4	62.3	3 11.7	61.6	3 54.0	60.8	10
7 00	2 45.6	65.3	3 27.3	64.6	4 08.9	63.9	4 50.5	63.2	5 32.0	62.4	7 00
6 50	4 27.4	66.9	5 08.6	66.2	5 49.7	65.5	6 30.7	64.8	7 11.6	64.0	6 50
40	6 10.7	68.6	6 51.2	67.8	7 31.7	67.1	8 12.1	66.3	8 52.4	65.6	40
30	7 54.8	70.1	8 35.1	69.4	9 15.0	68.6	9 54.8	67.9	10 34.6	67.1	30
20	9 40.3	71.7	10 19.9	71.0	10 59.3	70.2	11 38.6	69.5	12 17.8	68.7	20
10	11 26.6	73.3	12 05.7	72.5	12 44.7	71.7	13 23.5	71.0	14 02.2	70.2	10
6 00	13 13.8	74.9	13 52.5	74.1	14 31.0	73.3	15 09.4	72.5	15 47.6	71.7	6 00
5 50	15 01.7	76.4	15 40.1	75.6	16 18.2	74.8	16 56.2	74.0	17 33.8	73.2	5 50
40	16 50.5	78.0	17 28.4	77.2	18 06.2	76.4	18 43.7	75.5	19 21.0	74.7	40
30	18 39.7	79.5	19 17.4	78.7	19 54.8	77.9	20 31.9	77.0	21 08.8	76.2	30
20	20 29.6	81.1	21 07.0	80.3	21.44.1	79.4	22 21.0	78.6	22 57.6	77.7	20
10	22 20.0	82.7	22 57.1	81.8	23 34.0	80.9	24 10.4	80.1	24 46.7	79.2	10
5 00	24 10.7	84.3	24 47.6	83.4	25 24.2	82.5	26 00.5	81.6	26 36.5	80.7	5 00
4 50	26 01.8	85.9	26 38.7	85.0	27 15.0	84.1	27 51.0	83.2	28 26.7	83.2	4 50
40	27 53.1	87.5	28 29.7	86.6	29 06.0	85.7	29 41.9	84.7	30 17.4	83.8	40
30	29 44.5	89.1	30 21.1	88.2	30 57.2	87.3	31 32.9	86.3	32 08.2	85.4	30
20	31 35.9	90.8	32 12.5	89.9	32 48.6	88.9	33 24.4	87.9	33 59.6	87.0	20
10	33 27.4	92.5	34 03.9	91.6	34 40.1	90.6	35 15.7	89.6	35 50.9	88.6	10
4 00	35 18.6	94.2	35 55.3	93.3	36 31.5	92.3	37 07.2	91.3	37 42.4	90.3	4 00
3 50	37 09.7	96.0	37 46.6	95.0	38 22.8	94.0	38 58.6	93.0	39 33.8	92.0	3 50
40	39 00.3	97.9	39 37.3	96.9	40 13.9	95.8	40 49.9	94.8	41 25.2	93.7	40
30	40 50.4	99.8	41 27.9	98.8	42 04.6	97.7	42 40.7	96.6	43 16.3	95.5	30
20	42 40.0	101.8	43 17.7	100.7	43 54.8	99.6	44 31.3	98.5	45 07.1	97.4	20
10	44 28.7	103.8	45 06.9	102.7	45 44.4	101.6	46 21.2	100.5	46 57.3	99.4	10
3 00	46 16.4	106.0	46 55.0	104.9	47 33.1	103.7	48 10.5	102.6	48 47.1	101.4	3 00
2 50	48 03.0	108.3	48 42.2	107.1	49 20.7	105.9	49 58.7	104.8	50 35.8	103.6	2 50
40	49 47.9	110.6	50 28.0	109.5	51 07.4	108.3	51 46.0	107.1	52 23.8	105.8	40
30	51 31.4	113.2	52 12.2	112.0	52 52.5	110.7	53 31.7	109.5	54 10.2	108.2	30
20	53 12.8	115.8	53 54.6	114.6	54 35.7	113.4	55 16.1	112.1	55 55.5	110.8	20
10	54 52.0	118.7	55 35.0	117.5	56 17.0	116.2	56 58.1	114.9	57 38.6	113.5	10
2 00	56 28.4	121.7	57 12.4	120.5	57 55.7	119.2	58 38.3	117.8	59 19.8	116.5	2 00
1 50	58 01.5	125.0	58 46.7	123.7	59 31.4	122.4	60 15.1	121.1	60 58.1	119.7	1 50
40	59 30.7	128.5	60 17.5	127.2	61 03.7	125.9	61 49.1	124.6	62 33.5	123.2	40
30	60 55.7	132.4	61 44.0	131.1	62 31.7	129.7	63 18.6	128.4	64 04.6	127.0	30
20	62 15.5	136.5	63 05.5	135.2	63 54.9	133.9	64 43.6	132.5	65 31.4	131.1	20
10	63 29.5	140.9	64 21.2	139.7	65 12.3	138.4	66 02.6	137.1	66 52.4	135.7	10
1 00	64 36.3	145.6	65 29.8	144.4	66 22.8	143.2	67 15.3	141.9	68 07.1	140.6	1 00
0 50	65 35.5	150.7	66 30.7	149.6	67 25.5	148.5	68 19.5	147.4	69 13.5	146.2	0 50
40	66 25.7	156.1	67 22.4	155.2	68 18.9	154.2	69 15.1	153.2	70 10.9	152.1	40
30	67 06.1	161.7	68 04.3	161.0	69 02.1	160.2	69 59.9	159.4	70 57.0	158.5	30
20	67 35.6	167.7	68 34.8	167.2	69 33.9	166.6	70 32.9	166.1	71 31.8	165.5	20
10	67 54.0	173.7	68 53.7	173.5	69 53.5	173.2	70 53.0	173.0	71 53.0	172.7	10
0 00	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 51.5	91.6	1 11.4	92.4	0 31.1	93.2					5 50
40	3 42.8	93.3	3 02.6	94.1	2 22.4	94.8	1 42.1	95.6	1 01.8	96.3	40
30	5 34.0	95.0	4 53.8	95.8	4 13.2	96.5	3 32.8	97.3	2 52.2	98.0	30
20	7 24.9	96.7	6 44.4	97.5	6 03.8	98.2	5 23.2	99.0	4 42.5	99.7	20
10	9 15.4	98.4	8 34.7	99.2	7 53.8	99.9	7 12.9	100.7	6 32.0	101.4	10
5 00	11 05.4	100.2	10 24.5	100.9	9 43.4	101.7	9 02.2	102.4	8 21.0	103.1	5 00
4 50	12 54.8	101.9	12 13.6	102.6	11 32.2	103.4	10 50.7	104.1	10 09.1	104.8	4 50
40	14 43.4	103.7	14 01.9	104.4	13 20.2	105.2	12 38.4	105.9	11 56.5	106.6	40
30	16 31.4	105.5	15 49.4	106.2	15 07.2	107.0	14 25.0	107.7	13 42.7	108.4	30
20	18 18.3	107.3	17 35.9	108.1	16 53.4	108.8	16 10.7	109.5	15 27.9	110.3	20
10	20 04.0	109.2	19 21.4	110.0	18 38.2	110.7	17 55.1	111.4	17 11.7	112.2	10
4 00	21 48.8	111.1	21 05.5	111.9	20 21.9	112.6	19 38.2	113.3	18 54.3	114.1	4 00
3 50	23 32.0	113.1	22 48.2	113.9	22 04.1	114.6	21 19.8	115.3	20 35.3	116.0	3 50
40	25 13.8	115.1	24 29.3	115.9	23 44.7	116.6	22 59.8	117.3	22 14.7	118.0	40
30	26 53.8	117.2	26 08.8	117.9	25 23.4	118.7	24 37.8	119.4	23 52.1	120.1	30
20	28 32.1	119.3	27 46.3	120.0	27 00.2	120.8	26 14.0	121.5	25 27.5	122.2	20
10	30 08.1	121.5	29 21.7	122.2	28 34.7	123.0	27 47.8	123.7	27 00.7	124.4	10
3 00	31 42.0	123.8	30 54.7	124.5	30 07.2	125.2	29 19.5	125.9	28 31.5	126.6	3 00
2 50	33 13.4	126.2	32 25.2	126.9	31 36.9	127.6	30 48.3	128.3	29 59.6	128.9	2 50
40	34 41.0	128.6	33 53.1	129.3	33 03.9	130.0	32 14.5	130.6	31 24.9	131.3	40
30	36 07.6	131.1	35 17.8	131.8	34 27.8	132.5	33 37.4	133.1	32 47.1	133.8	30
20	37 29.9	133.7	36 39.2	134.4	35 48.3	135.0	34 57.2	135.6	34 05.9	136.3	20
10	38 48.6	136.4	37 57.0	137.1	37 05.2	137.7	36 13.2	138.3	35 21.0	138.9	10
2 00	40 03.6	139.2	39 11.1	139.9	38 18.3	140.5	37 25.4	141.1	36 32.3	141.6	2 00
1 50	41 14.2	142.1	40 20.8	142.7	39 27.1	143.3	38 33.2	143.9	37 39.2	144.4	1 50
40	42 20.4	145.1	41 26.0	145.7	40 31.5	146.3	39 36.8	146.8	38 41.9	147.3	40
30	43 21.5	148.3	42 26.3	148.8	41 30.8	149.3	40 35.3	149.8	39 39.6	150.3	30
20	44 17.6	151.5	43 21.5	152.0	42 25.2	152.4	41 28.9	152.9	40 32.4	153.3	20
10	45 07.9	154.8	44 11.0	155.2	43 13.9	155.6	42 16.8	156.1	41 19.6	156.5	10
1 00	45 52.5	158.2	44 54.8	158.6	43 57.0	158.9	42 59.2	159.3	42 01.3	159.7	1 00
0 50	46 30.8	161.7	45 32.5	162.0	44 34.0	162.3	43 35.4	162.6	42 37.0	163.0	0 50
40	47 02.5	165.2	46 03.6	165.5	45 04.6	165.8	44 05.6	166.0	43 06.6	166.3	40
30	47 27.5	168.9	46 28.1	169.1	45 28.8	169.3	44 29.2	169.5	43 29.8	169.7	30
20	47 45.5	172.6	46 45.8	172.7	45 46.1	172.8	44 46.4	173.0	43 46.7	173.1	20
10	47 56.4	176.3	46 56.5	176.3	45 56.5	176.4	44 56.6	176.5	43 56.7	176.5	10
0 00	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——28

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 40	0 21.4	97.1									5 40
30	2 11.8	98.7	1 31.2	99.5	0 50.7	100.2	0 10.1	100.9			30
20	4 01.7	100.4	3 20.9	101.2	2 40.1	101.9	1 59.2	102.6	1 18.4	103.4	20
10	5 51.1	102.1	5 09.9	102.9	4 28.8	103.6	3 47.7	104.3	3 06.4	105.1	10
5 00	7 39.7	103.8	6 58.2	104.6	6 16.8	105.3	5 35.2	106.1	4 53.6	106.8	5 00
4 50	9 27.4	105.6	8 45.7	106.3	8 03.8	107.0	7 21.9	107.8	6 39.8	108.5	4 50
40	11 14.4	107.4	10 32.2	108.1	9 49.8	108.8	9 07.4	109.5	8 25.0	110.2	40
30	13 00.2	109.2	12 17.6	109.9	11 34.8	110.6	10 51.9	111.3	10 09.0	112.0	30
20	14 44.9	111.0	14 01.8	111.7	13 18.5	112.4	12 35.1	113.1	11 51.6	113.8	20
10	16 28.2	112.9	15 44.5	113.6	15 00.8	114.3	14 16.9	115.0	13 32.8	115.7	10
4 00	18 10.2	114.8	17 26.0	115.5	16 41.6	116.2	15 57.1	116.9	15 12.5	117.6	4 00
3 50	19 50.6	116.7	19 05.8	117.4	18 20.8	118.1	17 35.8	118.8	16 50.4	119.5	3 50
40	21 29.4	118.7	20 43.9	119.4	19 58.2	120.1	19 12.4	120.8	18 26.5	121.5	40
30	23 06.2	120.8	22 20.0	121.5	21 33.6	122.1	20 47.1	122.8	20 00.5	123.5	30
20	24 40.8	122.9	23 54.0	123.6	23 06.9	124.2	22 19.7	124.9	21 32.3	125.6	20
10	26 13.2	125.1	25 25.7	125.7	24 37.9	126.4	23 49.9	127.0	23 01.8	127.7	10
3 00	27 43.3	127.3	26 54.9	127.9	26 06.3	128.6	25 17.6	129.2	24 28.7	129.9	3 00
2 50	29 10.6	129.6	28 21.4	130.2	27 32.1	130.9	26 42.5	131.5	25 52.8	132.1	2 50
40	30 35.1	132.0	29 45.0	132.6	28 54.8	133.2	28 04.4	133.8	27 13.9	134.4	40
30	31 56.3	134.4	31 05.6	135.0	30 14.5	135.6	29 23.2	136.2	28 31.9	136.8	30
20	33 14.3	136.9	32 22.6	137.5	31 30.7	138.1	30 38.6	138.7	29 46.4	139.3	20
10	34 28.6	139.5	33 36.0	140.1	32 43.2	140.7	31 50.3	141.2	30 57.4	141.8	10
2 00	35 39.0	142.2	34 45.5	142.7	33 51.9	143.3	32 58.1	143.8	32 04.3	144.4	2 00
1 50	36 45.2	145.0	35 50.8	145.5	34 56.4	146.0	34 01.8	146.5	33 07.2	147.0	1 50
40	37 46.9	147.8	36 51.8	148.3	35 56.5	148.8	35 01.1	149.3	34 05.6	149.7	40
30	38 43.8	150.7	37 47.9	151.2	36 51.8	151.7	35 55.7	152.1	34 59.5	152.5	30
20	39 35.8	153.7	38 39.1	154.2	37 42.3	154.6	36 45.4	155.0	35 48.4	155.4	20
10	40 22.2	156.8	39 24.9	157.2	38 27.4	157.6	37 29.8	158.0	36 32.3	158.3	10
1 00	41 03.3	160.0	40 05.2	160.3	39 07.1	160.7	38 08.9	161.0	37 10.7	161.3	1 00
0 50	41 38.5	163.2	40 39.8	163.5	39 41.2	163.8	38 42.5	164.1	37 43.7	164.3	0 50
40	42 07.5	166.5	41 08.5	166.7	40 09.3	167.0	39 10.2	167.2	38 11.0	167.4	40
30	42 30.4	169.8	41 30.9	170.0	40 31.3	170.2	39 31.8	170.4	38 32.3	170.5	30
20	42 46.9	173.2	41 47.1	173.3	40 47.2	173.4	39 47.4	173.6	38 47.6	173.7	20
10	42 56.8	176.6	41 56.8	176.6	40 56.8	176.7	39 56.8	176.8	38 56.9	176.8	10
0 00	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 37.5	104.1									5 20
10	2 25.2	105.8	1 43.9	106.5	1 02.6	107.2	0 21.4	107.9			10
5 00	4 12.0	107.5	3 30.3	108.2	2 48.6	108.9	2 06.9	109.6	1 25.1	110.4	5 00
4 50	5 57.9	109.2	5 15.6	109.9	4 33.5	110.6	3 51.2	111.3	3 09.0	112.1	4 50
40	7 42.4	111.0	6 59.9	111.7	6 17.2	112.4	5 34.5	113.1	4 51.7	113.8	40
30	9 26.0	112.8	8 42.9	113.4	7 59.6	114.1	7 16.3	114.8	6 32.9	115.5	30
20	11 08.0	114.6	10 24.4	115.2	9 40.6	115.9	8 56.8	116.6	8 12.8	117.3	20
10	12 48.7	116.4	12 04.5	117.1	11 20.0	117.7	10 35.7	118.4	9 51.1	119.1	10
4 00	14 27.7	118.3	13 42.8	119.0	12 57.8	119.6	12 12.7	120.3	11 27.5	121.0	4 00
3 50	16 04.9	120.2	15 19.4	120.9	14 33.8	121.5	13 48.0	122.2	13 02.2	122.9	3 50
40	17 40.4	122.2	16 54.2	122.8	16 07.8	123.5	15 21.3	124.1	14 34.7	124.8	40
30	19 13.6	124.2	18 26.8	124.8	17 39.7	125.5	16 52.5	126.1	16 05.2	126.8	30
20	20 44.8	126.2	19 57.1	126.9	19 09.3	127.5	18 21.4	128.1	17 33.3	128.8	20
10	22 13.5	128.3	21 25.0	129.0	20 36.5	129.6	19 47.8	130.2	18 59.0	130.9	10
3 00	23 39.6	130.5	22 50.3	131.1	22 00.9	131.8	21 11.4	132.4	20 21.8	133.0	3 00
2 50	25 03.0	132.7	24 12.9	133.3	23 22.8	134.6	22 32.6	134.6	21 42.1	135.2	2 50
40	26 23.2	135.0	25 32.4	135.6	24 41.4	136.2	23 50.3	136.8	22 59.1	137.4	40
30	27 40.4	137.4	26 48.7	138.0	25 56.9	138.6	25 05.1	139.1	24 13.1	139.7	30
20	28 54.1	139.8	28 01.6	140.4	27 09.0	140.9	26 16.3	141.4	25 23.4	142.0	20
10	30 04.2	142.3	29 10.9	142.9	28 17.5	143.4	27 23.9	143.9	26 30.4	144.4	10
2 00	31 10.3	144.9	30 16.2	145.4	29 22.0	145.9	28 27.7	146.4	27 33.2	146.8	2 00
1 50	32 12.4	147.5	31 17.5	148.0	30 22.5	148.5	29 27.4	148.9	28 32.2	149.3	1 50
40	33 10.0	150.2	32 14.4	150.6	31 18.6	151.1	30 22.8	151.5	29 26.9	151.9	40
30	34 03.2	153.0	33 06.8	153.4	32 10.2	153.8	31 13.8	154.2	30 17.1	154.5	30
20	34 51.4	155.8	33 54.3	156.1	32 57.1	156.5	31 59.9	156.9	31 02.7	157.2	20
10	35 34.7	158.7	34 36.9	159.0	33 39.1	159.3	32 41.2	159.6	31 43.4	159.9	10
1 00	36 12.5	161.6	35 14.2	161.9	34 15.9	162.2	33 17.5	162.4	32 19.1	162.7	1 00
0 50	36 44.9	164.6	35 46.2	164.9	34 47.3	165.1	33 48.5	165.3	32 49.6	165.5	0 50
40	37 11.8	167.6	36 12.6	167.8	35 13.3	168.0	34 14.0	168.2	33 14.7	168.4	40
30	37 32.7	170.7	36 33.2	170.8	35 33.6	171.0	34 34.1	171.1	33 34.6	171.3	30
20	37 47.8	173.8	36 48.0	173.9	35 48.2	174.0	34 48.4	174.1	33 48.6	174.2	20
10	37 56.9	176.9	36 57.0	176.9	35 57.0	177.0	34 57.1	177.0	33 57.2	177.1	10
0 00	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 43.4	111.1	0 01.6	111.8							5 00
4 50	2 26.7	112.8	1 44.3	113.5	1 02.3	114.2	0 19.8	114.9			4 50
40	4 08.9	114.5	3 26.0	115.2	2 43.1	115.9	2 00.2	116.6	1 17.3	117.3	40
30	5 49.6	116.2	5 06.1	116.9	4 22.7	117.6	3 39.1	118.3	2 55.6	119.0	30
20	7 28.8	118.0	6 44.8	118.7	6 00.7	119.4	5 16.5	120.1	4 32.3	120.7	20
10	9 06.4	119.8	8 21.6	120.5	7 36.9	121.2	6 52.1	121.8	6 07.1	122.5	10
4 00	10 42.2	121.6	9 56.8	122.3	9 11.4	123.0	8 25.8	123.6	7 40.3	124.3	4 00
3 50	12 16.1	123.5	11 30.1	124.2	10 43.9	124.8	9 57.7	125.5	9 11.4	126.1	3 50
40	13 48.0	125.4	13 01.2	126.1	12 14.3	126.7	11 27.3	127.4	10 40.3	128.0	40
30	15 17.8	127.4	14 30.1	128.0	13 42.6	128.6	12 54.8	129.3	12 07.0	129.9	30
20	16 45.1	129.4	15 56.8	130.0	15 08.4	130.6	14 19.9	131.3	13 31.3	131.9	20
10	18 10.0	131.5	17 20.9	132.1	16 31.4	132.7	15 42.4	133.3	14 53.0	133.9	10
3 00	19 32.1	133.6	18 42.3	134.2	17 52.3	134.7	17 02.3	135.3	16 12.1	135.9	3 00
2 50	20 51.4	135.7	20 00.8	136.3	19 10.0	136.8	18 19.1	137.4	17 28.2	138.0	2 50
40	22 07.8	137.9	21 16.3	138.4	20 24.7	139.0	19 33.0	139.6	18 41.3	140.1	40
30	23 20.8	140.2	22 28.6	140.7	21 36.1	141.3	20 43.7	141.8	19 51.2	142.3	30
20	24 30.5	142.5	23 37.4	143.0	22 44.2	143.5	21 51.0	144.0	20 57.6	144.5	20
10	25 36.5	144.9	24 42.7	145.4	23 48.8	145.8	22 54.8	146.3	22 00.6	146.8	10
2 00	26 38.7	147.3	25 44.1	147.8	24 49.4	148.2	23 54.7	148.7	22 59.8	149.1	2 00
1 50	27 36.9	149.8	26 41.6	150.2	25 46.1	150.6	24 50.6	151.1	23 55.0	151.5	1 50
40	28 30.9	152.3	27 34.8	152.7	26 38.6	153.1	25 42.4	153.5	24 46.1	153.9	40
30	29 20.4	154.9	28 23.7	155.3	27 26.9	155.6	26 30.0	156.0	25 33.0	156.4	30
20	30 05.4	157.6	29 08.0	157.9	28 10.6	158.2	27 13.1	158.6	26 15.6	158.9	20
10	30 45.5	160.3	29 47.6	160.6	28 49.5	160.9	27 51.5	161.2	26 53.4	161.4	10
1 00	31 20.7	163.0	30 22.2	163.3	29 23.7	163.5	28 25.2	163.8	27 26.6	164.0	1 00
0 50	31 50.7	165.8	30 51.9	166.0	29 52.8	166.2	28 53.8	166.4	27 54.8	166.6	0 50
40	32 15.4	168.6	31 16.1	168.8	30 16.8	168.9	29 17.5	169.1	28 18.1	169.3	40
30	32 34.9	171.4	31 35.2	171.5	30 35.7	171.6	29 36.1	171.8	28 36.4	171.9	30
20	32 48.8	174.2	31 49.0	174.3	30 49.2	174.4	29 49.4	174.5	28 49.5	174.6	20
10	32 57.2	177.1	31 57.2	177.1	30 57.4	177.2	29 57.4	177.2	28 54.7	177.3	10
0 00	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	0 34.3	118.0									4 40
30	2 12.1	119.7	1 28.4	120.4	0 44.7	121.0	0 01.1	121.7			30
20	3 48.0	121.4	3 03.7	122.1	2 19.4	122.8	1 35.1	123.4	0 50.8	124.1	20
10	5 22.2	123.1	4 37.2	123.8	3 52.2	124.5	3 07.2	125.2	2 22.1	125.8	10
4 00	6 54.6	124.9	6 08.9	125.6	5 23.2	126.2	4 37.4	126.9	3 51.6	127.5	4 00
3 50	8 25.0	126.7	7 38.6	127.4	6 52.0	128.0	6 05.5	128.7	5 18.8	129.3	3 50
40	9 53.1	128.6	9 05.9	129.2	8 18.7	129.9	7 31.4	130.5	6 44.0	131.1	40
30	11 19.1	130.5	10 31.2	131.1	9 43.1	131.7	8 54.9	132.3	8 06.8	132.9	30
20	12 42.6	132.5	11 53.9	133.0	11 05.1	133.6	10 16.2	134.2	9 27.2	134.8	20
10	14 03.6	134.5	13 14.1	135.0	12 24.4	135.6	11 34.7	136.2	10 44.9	136.7	10
3 00	15 21.8	136.4	14 31.5	137.0	13 41.1	137.6	12 50.6	138.1	12 00.0	138.7	3 00
2 50	16 37.2	138.5	15 46.1	139.1	14 54.7	139.6	14 03.5	140.1	13 12.1	140.7	2 50
40	17 49.4	140.6	16 57.5	141.1	16 05.5	141.7	15 13.4	142.2	14 21.3	142.7	40
30	18 58.5	142.8	18 05.8	143.3	17 13.1	143.8	16 20.1	144.3	15 27.2	144.8	30
20	20 04.2	145.0	19 10.7	145.5	18 17.2	146.0	17 23.6	146.4	16 29.9	146.9	20
10	21 06.4	147.2	20 12.2	147.7	19 17.8	148.2	18 23.3	148.6	17 29.0	149.0	10
2 00	22 04.9	149.5	21 09.9	150.0	20 14.8	150.4	19 19.7	150.8	18 24.5	151.2	2 00
1 50	22 59.4	151.9	22 03.7	152.3	21 07.9	152.7	20 12.1	153.1	19 16.2	153.4	1 50
40	23 49.8	154.3	22 53.5	154.7	21 57.1	155.0	21 00.7	155.4	20 04.2	155.7	40
30	24 36.2	156.7	23 39.1	157.1	22 42.1	157.4	21 45.0	157.7	20 47.8	158.0	30
20	25 18.0	159.2	24 20.4	159.5	23 22.8	159.8	22 25.1	160.1	21 27.4	160.4	20
10	25 55.4	161.7	24 57.2	162.0	23 59.1	162.2	23 00.8	162.5	22 02.7	162.8	10
1 00	26 28.0	164.2	25 29.4	164.5	24 30.8	164.7	23 32.2	164.9	22 33.5	165.2	1 00
0 50	26 55.8	166.8	25 56.9	167.0	24 57.8	167.2	23 58.7	167.4	22 59.7	167.6	0 50
40	27 18.8	169.4	26 19.5	169.6	25 20.1	169.8	24 20.8	169.9	23 21.4	170.1	40
30	27 36.8	172.0	26 37.2	172.2	25 37.5	172.3	24 37.9	172.4	23 38.2	172.5	30
20	27 49.7	174.7	26 49.9	174.8	25 50.0	174.8	24 50.2	174.9	23 50.3	175.0	20
10	27 57.5	177.3	26 57.5	177.4	25 57.5	177.4	24 57.5	177.5	23 57.6	177.5	10
0 00	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 13.2	86.1	0 54.1	85.4	6 10
6 00	0 00.0	90.0	0 41.0	89.3	0 21.9	88.5	2 02.8	87.8	2 43.7	87.1	6 00
5 50	1 49.7	91.7	2 30.6	91.0	3 11.4	90.2	3 52.4	89.5	4 33.5	88.8	5 50
40	3 39.3	93.4	4 20.3	92.7	5 01.4	92.0	5 42.2	91.2	6 23.0	90.5	40
30	5 28.6	95.1	6 09.8	94.4	6 50.8	93.7	7 31.7	92.9	8 12.5	92.2	30
20	7 17.8	96.9	7 59.0	96.1	8 40.1	95.4	9 21.2	94.7	10 02.1	93.9	20
10	9 06.5	98.6	9 47.8	97.8	10 29.1	97.1	11 10.3	96.4	11 51.4	95.6	10
5 00	10 54.7	100.4	11 36.3	99.6	12 17.9	98.9	12 59.3	98.1	13 40.5	97.4	5 00
4 50	12 42.2	102.1	13 24.1	101.4	14 05.9	100.7	14 47.6	99.9	15 28.9	99.2	4 50
40	14 29.1	103.9	15 11.3	103.2	15 53.4	102.5	16 35.3	101.7	17 17.1	101.0	40
30	16 15.2	105.7	16 57.8	105.0	17 40.0	104.3	18 22.3	103.5	19 04.4	102.8	30
20	18 00.2	107.6	18 43.2	106.9	19 26.0	106.2	20 08.6	105.4	20 51.0	104.7	20
10	19 44.2	109.5	20 27.6	108.8	21 10.7	108.1	21 53.8	107.3	22 36.6	106.6	10
4 00	21 26.9	111.5	22 10.8	110.8	22 54.5	110.0	23 38.0	109.3	24 21.3	108.5	4 00
3 50	23 08.2	113.5	23 52.8	112.8	24 36.8	112.0	25 20.9	111.3	26 04.6	110.5	3 50
40	24 48.1	115.5	25 33.1	114.8	26 17.9	114.1	27 02.4	113.3	27 46.7	112.5	40
30	26 26.2	117.6	27 11.8	116.9	27 57.2	116.2	28 42.3	115.5	29 27.2	114.6	30
20	28 02.5	119.8	28 48.8	119.1	29 34.8	118.3	30 20.5	117.6	31 06.1	116.8	20
10	29 36.6	122.0	30 23.6	121.3	31 10.2	120.6	31 56.8	119.8	32 42.9	119.1	10
3 00	31 08.5	124.3	31 56.2	123.6	32 43.6	122.9	33 30.9	122.1	34 17.8	121.4	3 00
2 50	32 37.8	126.7	33 26.2	126.0	34 14.4	125.2	35 02.3	124.5	35 50.2	123.8	2 50
40	34 04.4	129.1	34 53.7	128.4	35 42.7	127.7	36 31.6	127.0	37 20.1	126.3	40
30	35 27.9	131.6	36 18.1	131.0	37 07.9	130.3	37 57.6	129.6	38 47.0	128.9	30
20	36 48.3	134.3	37 39.3	133.6	38 30.1	132.9	39 20.7	132.2	40 10.9	131.5	20
10	38 05.0	137.0	38 56.9	136.3	39 48.5	135.7	40 40.0	135.0	41 31.2	134.3	10
2 00	39 18.0	139.8	40 10.8	139.1	41 03.4	138.5	41 55.8	137.8	42 47.9	137.2	2 00
1 50	40 26.6	142.7	41 20.4	142.1	42 13.8	141.5	43 07.2	140.8	44 00.2	140.2	1 50
40	41 31.0	145.7	42 25.6	145.1	43 20.0	144.5	44 14.2	143.9	45 08.3	143.3	40
30	42 30.3	148.7	43 25.9	148.2	44 21.1	147.7	45 16.2	147.1	46 11.2	146.5	30
20	43 24.8	151.9	44 21.0	151.4	45 17.2	150.9	46 13.2	150.4	47 09.1	149.9	20
10	44 13.6	155.2	45 10.7	154.8	46 07.6	154.3	47 04.4	153.8	48 01.1	153.3	10
1 00	44 56.7	158.6	45 54.5	158.2	46 52.3	157.8	47 49.9	157.4	48 47.4	156.9	1 00
0 50	45 33.8	162.0	46 32.1	161.6	47 30.5	161.3	48 28.9	161.0	49 27.0	160.6	0 50
40	46 04.5	165.5	47 03.4	165.2	48 02.4	165.0	49 01.3	164.7	50 00.2	164.4	40
30	46 28.6	169.1	47 28.1	168.9	48 27.4	168.7	49 26.8	168.4	50 26.1	168.2	30
20	46 46.0	172.7	47 45.8	172.6	48 45.6	172.4	49 45.3	172.3	50 45.0	172.1	20
10	46 56.5	176.4	47 56.4	176.3	48 56.2	176.2	49 56.2	176.1	50 56.1	176.0	10
0 00	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 01.4	79.0	0 42.6	78.4	6 30
20			0 27.2	82.2	1 08.3	81.5	1 49.4	80.7	2 30.4	80.0	20
10	1 35.2	84.6	2 16.1	83.9	2 57.0	83.2	3 37.9	82.4	4 18.7	81.7	10
6 00	3 24.5	86.3	4 05.3	85.6	4 46.1	84.9	5 26.8	84.1	6 07.5	83.4	6 00
5 50	5 14.1	88.0	5 54.8	87.3	6 35.5	86.6	7 16.1	85.8	7 56.6	85.1	5 50
40	7 03.8	89.7	7 44.5	89.0	8 25.1	88.3	9 05.6	87.5	9 46.0	86.8	40
30	8 53.4	91.4	9 34.1	90.7	10 14.7	90.0	10 55.2	89.2	11 35.6	88.5	30
20	10 43.0	93.1	11 23.7	92.4	12 04.5	91.7	12 45.0	90.9	13 25.4	90.2	20
10	12 32.6	94.9	13 13.4	94.1	13 54.0	93.4	14 34.6	92.6	15 15.0	91.9	10
5 00	14 21.6	96.7	15 02.6	95.9	15 43.5	95.1	16 24.1	94.4	17 04.6	93.6	5 00
4 50	16 10.3	98.4	16 51.6	97.6	17 32.5	96.9	18 13.4	96.1	18 54.0	95.3	4 50
40	17 58.6	100.2	18 40.0	99.4	19 21.2	98.7	20 02.2	97.9	20 43.0	97.1	40
30	19 46.2	102.0	20 27.9	101.2	21 09.3	100.5	21 50.5	99.7	22 31.6	98.9	30
20	21 33.2	103.9	22 15.2	103.1	22 56.9	102.4	23 38.4	101.6	24 19.7	100.8	20
10	23 19.2	105.8	24 01.6	105.0	24 43.6	104.3	25 25.5	103.5	26 37.1	102.7	10
4 00	25 04.3	107.7	25 47.0	107.0	26 29.5	106.2	27 11.8	105.4	27 53.8	104.6	4 00
3 50	26 48.2	109.7	27 31.3	109.0	28 14.3	108.2	28 57.1	107.4	29 39.5	106.6	3 50
40	28 30.8	111.8	29 14.5	111.0	29 58.0	110.2	30 41.2	109.4	31 24.1	108.6	40
30	30 11.8	113.9	30 56.2	113.1	31 40.2	112.3	32 24.0	111.5	33 07.3	110.7	30
20	31 51.3	116.1	32 36.2	115.3	33 29.0	114.5	34 05.2	113.7	34 49.2	112.8	20
10	33 28.9	118.3	34 14.6	117.5	34 59.8	116.7	35 44.9	115.9	36 29.6	115.1	10
3 00	35 04.4	120.6	35 50.8	119.8	36 36.9	119.0	37 22.5	118.2	38 07.9	117.4	3 00
2 50	36 37.6	123.0	37 24.8	122.2	38 11.6	121.4	38 58.1	120.6	39 44.2	119.8	2 50
40	38 08.3	125.5	38 56.3	124.7	39 43.9	123.9	40 31.2	123.1	41 18.2	122.3	40
30	39 36.1	128.1	40 25.0	127.3	41 13.5	126.5	42 01.7	125.7	42 49.6	124.9	30
20	41 01.0	130.8	41 50.7	130.0	42 40.0	129.3	43 29.1	128.5	44 17.9	127.7	20
10	42 22.2	133.6	43 12.8	132.8	44 03.2	132.1	44 53.4	131.3	45 43.1	130.5	10
2 00	43 39.8	136.5	44 31.4	135.8	45 22.8	135.1	46 13.8	134.3	47 04.6	133.5	2 00
1 50	44 53.2	139.5	45 45.8	138.8	46 38.1	138.1	47 30.2	137.4	48 22.0	136.7	1 50
40	46 02.1	142.7	46 55.7	142.0	47 49.1	141.3	48 42.2	140.6	49 35.0	139.9	40
30	47 06.1	145.9	48 00.8	145.3	48 55.0	144.7	49 49.3	144.0	50 43.2	143.3	30
20	48 04.8	149.3	49 00.4	148.8	49 55.8	148.2	50 50.9	147.6	51 45.9	146.9	20
10	48 57.8	152.8	49 54.3	152.3	50 50.7	151.8	51 46.8	151.2	52 42.7	150.6	10
1 00	49 44.8	156.5	50 42.1	156.0	51 39.3	155.6	52 36.4	155.1	53 33.3	154.5	1 00
0 50	50 25.2	160.2	51 23.4	159.8	52 21.3	159.4	53 19.2	159.0	54 17.0	158.5	0 50
40	50 59.0	164.1	51 57.7	163.7	52 56.4	163.4	53 55.0	163.0	54 53.5	162.7	40
30	51 25.4	168.0	52 24.8	167.7	53 23.9	167.4	54 23.1	167.1	55 22.3	166.9	30
20	51 44.6	171.9	52 44.3	171.8	53 43.9	171.6	54 43.5	171.4	55 43.2	171.2	20
10	51 56.1	176.0	52 56.0	175.9	53 55.9	175.8	54 55.9	175.7	55 55.9	175.6	10
0 00	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

26°07.1

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 39.1	71.3	6 50
40			0 18.8	75.2	1 00.4	74.4	1 42.0	73.7	2 23.6	73.0	40
30	1 23.9	77.6	2 05.2	76.9	2 46.5	76.1	3 27.8	75.4	4 09.0	74.7	30
20	3 11.5	79.3	3 52.5	78.6	4 33.5	77.8	5 14.4	77.1	5 55.3	76.4	20
10	4 59.5	81.0	5 40.3	80.2	6 20.9	79.5	7 01.6	78.8	7 42.1	78.0	10
6 00	6 48.1	82.7	7 28.7	81.9	8 09.1	81.2	8 49.5	80.4	9 29.8	79.7	6 00
5 50	8 37.1	84.3	9 17.4	83.6	9 57.7	82.8	10 37.9	82.1	11 18.1	81.3	5 50
40	10 26.4	86.0	11 06.6	85.3	11 46.8	84.5	12 26.8	83.7	13 06.7	83.0	40
30	12 15.9	87.7	12 56.0	86.9	13 36.1	86.2	14 15.9	85.4	14 55.8	84.6	30
20	14 05.6	89.4	14 45.7	88.6	15 25.6	87.9	16 05.4	87.1	16 45.1	86.3	20
10	15 55.3	91.1	16 35.4	90.3	17 15.4	89.6	17 55.1	88.8	18 34.7	88.0	10
5 00	17 45.0	92.8	18 25.1	92.0	19 05.1	91.3	19 44.8	90.5	20 24.3	89.7	5 00
4 50	19 34.4	94.5	20 14.6	93.7	20 54.6	93.0	21 34.4	92.2	22 14.0	91.4	4 50
40	21 23.6	96.3	22 04.0	95.5	22 44.1	94.7	23 23.9	93.9	24 03.6	93.1	40
30	23 12.5	98.1	23 52.9	97.3	24 33.2	96.5	25 13.3	95.7	25 53.0	94.9	30
20	25 00.7	100.0	25 41.6	99.2	26 22.1	98.3	27 02.3	97.5	27 42.2	96.7	20
10	26 48.5	101.9	27 29.5	101.0	28 10.3	100.2	28 50.7	99.4	29 30.8	98.5	10
4 00	28 35.4	103.8	29 16.9	102.9	29 57.9	102.1	30 38.7	101.3	31 19.1	100.4	4 00
3 50	30 21.7	105.7	31 03.3	104.9	31 44.8	104.1	32 25.9	103.2	33 06.8	102.3	3 50
40	32 06.6	107.7	32 48.9	106.9	33 30.7	106.1	34 12.2	105.2	34 53.4	104.3	40
30	33 50.5	109.8	34 33.2	109.0	35 15.6	108.2	35 57.6	107.3	36 39.2	106.4	30
20	35 32.9	112.0	36 16.2	111.1	36 59.1	110.3	37 41.7	109.4	38 23.9	108.5	20
10	37 13.9	114.3	37 57.7	113.4	38 41.4	112.5	39 24.5	111.6	40 07.4	110.7	10
3 00	38 52.9	116.6	39 37.6	115.7	40 21.8	114.8	41 05.6	113.9	41 49.1	113.0	3 00
2 50	40 30.0	119.0	41 15.4	118.1	42 00.4	117.2	42 45.0	116.3	43 29.1	115.4	2 50
40	42 04.7	121.5	42 51.0	120.6	43 36.9	119.7	44 22.2	118.8	45 07.3	117.9	40
30	43 37.1	124.1	44 24.2	123.2	45 10.8	122.3	45 57.1	121.4	46 43.0	120.5	30
20	45 06.4	126.9	45 54.4	126.0	46 42.1	125.1	47 29.3	124.2	48 16.2	123.3	20
10	46 32.5	129.7	47 21.5	128.8	48 10.2	127.9	48 58.5	127.1	49 46.3	126.2	10
2 00	47 55.0	132.7	48 45.2	131.9	49 34.9	131.0	50 24.2	130.2	51 13.2	129.3	2 00
1 50	49 13.6	135.9	50 04.7	135.1	50 55.6	134.2	51 46.0	133.4	52 36.1	132.5	1 50
40	50 27.6	139.2	51 20.0	138.4	52 11.9	137.6	53 03.6	136.8	53 54.9	135.9	40
30	51 36.9	142.6	52 30.2	141.9	53 23.3	141.2	54 16.2	140.3	55 08.8	139.5	30
20	52 40.7	146.3	53 35.2	145.6	54 29.5	144.8	55 23.4	144.1	56 17.2	143.3	20
10	53 38.7	150.0	54 34.0	149.4	55 29.6	148.7	56 24.5	148.0	57 19.8	147.3	10
1 00	54 30.2	154.0	55 26.8	153.4	56 23.2	152.8	57 19.5	152.2	58 15.6	151.5	1 00
0 50	55 14.7	158.1	56 12.2	157.6	57 09.6	157.0	58 07.0	156.5	59 04.8	155.9	0 50
40	55 52.0	162.3	56 50.4	161.9	57 48.7	161.4	58 46.9	161.0	59 45.0	160.5	40
30	56 21.5	166.6	57 20.5	166.3	58 19.5	165.9	59 18.5	165.6	60 17.4	165.2	30
20	56 42.8	171.0	57 42.3	170.8	58 41.9	170.6	59 41.4	170.3	60 40.9	170.1	20
10	56 55.7	175.5	57 55.5	175.4	58 55.3	175.3	59 55.2	175.1	60 55.2	175.0	10
0 00	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star it setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10							0 05.4	65.1	0 48.4	64.4	7 10
7 00			0 20.7	68.2	1 03.2	67.5	1 45.7	66.8	2 28.1	66.1	7 00
6 50	1 21.1	70.6	2 03.1	69.9	2 45.1	69.2	3 27.0	68.5	4 09.0	67.7	6 50
40	3 05.2	72.3	3 46.7	71.6	4 28.3	70.9	5 09.8	70.1	5 51.2	69.4	40
30	4 50.1	74.0	5 31.4	73.2	6 12.3	72.5	6 53.3	71.7	7 34.3	71.0	30
20	6 36.1	75.6	7 17.6	74.9	7 57.5	74.2	8 38.1	73.4	9 18.6	72.6	20
10	8 22.7	77.3	9 03.0	76.5	9 43.4	75.8	10 23.4	75.0	11 03.7	74.3	10
6 00	10 10.0	78.9	10 50.1	78.2	11 30.1	77.4	12 10.0	76.6	12 49.8	75.9	6 00
5 50	11 57.9	80.6	12 37.7	79.8	13 17.5	79.0	13 56.9	78.2	14 36.4	77.5	5 50
40	13 46.4	82.2	14 26.0	81.4	15 05.5	80.7	15 44.7	79.9	16 23.9	79.1	40
30	15 35.3	83.8	16 14.7	83.0	16 53.9	82.3	17 32.9	81.5	18 11.8	80.7	30
20	17 24.6	85.5	18 03.8	84.7	18 42.9	83.9	19 21.7	83.1	20 00.4	82.3	20
10	19 14.0	87.2	19 53.1	86.3	20 32.1	85.5	21 10.8	84.7	21 49.2	83.9	10
5 00	21 03.6	88.8	21 42.7	88.0	22 21.5	87.2	23 00.1	86.4	23 38.5	85.6	5 00
4 50	22 53.3	90.5	23 32.4	89.7	24 11.1	88.9	24 49.7	88.0	25 28.0	87.2	4 50
40	24 43.0	92.3	25 22.1	91.4	26 00.9	90.6	26 39.4	89.7	27 17.6	88.9	40
30	26 32.5	94.0	27 11.7	93.2	27 50.6	92.3	28 29.1	91.4	29 07.2	90.6	30
20	28 21.8	95.8	29 01.1	95.0	29 40.1	94.1	30 18.7	93.2	30 57.0	92.3	20
10	30 10.3	97.6	30 49.8	96.8	31 29.3	95.9	32 08.0	95.0	32 46.5	94.1	10
4 00	31 59.2	99.5	32 38.9	98.6	33 18.3	97.7	33 57.2	96.8	34 35.7	95.9	4 00
3 50	33 47.1	101.4	34 27.1	100.5	35 06.8	99.6	35 45.9	98.7	36 24.6	97.8	3 50
40	35 34.3	103.4	36 14.6	102.5	36 54.6	101.6	37 34.1	100.6	38 13.2	99.7	40
30	37 20.5	105.5	38 01.2	104.5	38 41.8	103.6	39 21.5	102.6	40 00.9	101.7	30
20	39 05.7	107.6	39 47.0	106.6	40 27.8	105.7	41 08.2	104.7	41 48.0	103.7	20
10	40 49.7	109.8	41 31.4	108.8	42 12.9	107.9	42 53.7	106.9	43 34.1	105.9	10
3 00	42 32.1	112.0	43 14.6	111.1	43 56.6	110.1	44 38.1	109.1	45 19.0	108.1	3 00
2 50	44 12.8	114.4	44 56.1	113.5	45 38.8	112.5	46 21.0	111.5	47 02.6	110.4	2 50
40	45 51.8	116.9	46 35.7	116.0	47 19.2	114.9	48 02.1	113.9	48 44.6	112.8	40
30	47 28.4	119.6	48 13.2	118.6	48 57.8	117.6	49 41.4	116.5	50 24.7	115.4	30
20	49 02.6	122.3	49 48.4	121.3	50 33.6	120.3	51 18.4	119.2	52 02.7	118.1	20
10	50 33.7	125.2	51 20.7	124.2	52 06.9	123.2	52 52.9	122.1	53 38.0	121.0	10
2 00	52 01.7	128.3	52 49.6	127.3	53 37.1	126.3	54 24.1	125.2	55 10.6	124.1	2 00
1 50	53 25.8	131.5	54 14.9	130.6	55 03.8	129.6	55 51.9	128.5	56 39.5	127.4	1 50
40	54 45.7	135.0	55 36.2	134.0	56 26.1	133.0	57 15.6	132.0	58 04.6	130.9	40
30	56 00.8	138.6	56 52.5	137.7	57 43.9	136.7	58 34.7	135.7	59 25.1	134.7	30
20	57 10.6	142.5	58 03.6	141.6	58 56.3	140.7	59 48.5	139.7	60 40.5	138.7	20
10	58 14.2	146.5	59 08.6	145.7	60 02.9	144.9	60 56.3	144.0	61 49.7	143.0	10
1 00	59 11.5	150.8	60 07.0	150.0	61 02.4	149.2	61 57.5	148.4	62 52.2	147.5	1 00
0 50	60 01.2	155.3	60 58.0	154.6	61 54.6	153.9	62 51.0	153.2	63 47.1	152.4	0 50
40	60 43.0	159.9	61 40.9	159.3	62 38.6	158.8	63 36.2	158.2	64 33.6	157.5	40
30	61 16.2	164.8	62 15.1	164.3	63 13.6	163.9	64 12.2	163.4	65 10.7	162.9	30
20	61 40.4	169.8	62 39.8	169.5	63 39.2	169.2	64 38.5	168.8	65 37.9	168.5	20
10	61 54.8	174.9	62 54.8	174.7	63 54.9	174.5	64 54.5	174.3	65 54.4	174.2	10
0 00	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30							0 31.2	58.3	1 14.7	57.6	7 30
20			0 37.4	61.3	1 20.9	60.6	2 04.4	60.0	2 47.9	59.3	20
10	1 31.3	63.7	2 14.4	63.0	2 57.3	62.3	3 40.2	61.6	4 23.2	60.9	10
7 00	3 10.6	65.4	3 53.0	64.7	4 35.3	64.0	5 17.6	63.3	5 59.8	62.5	7 00
6 50	4 50.8	67.0	5 32.7	66.3	6 14.4	65.6	6 56.2	64.9	7 37.8	64.1	6 50
40	6 32.5	68.7	7 13.8	67.9	7 55.0	67.2	8 36.1	66.5	9 17.1	65.7	40
30	8 15.2	70.3	8 56.0	69.6	9 36.7	68.8	10 17.3	68.1	10 58.0	67.3	30
20	9 59.0	71.9	10 39.4	71.2	11 19.5	70.4	11 59.6	69.7	12 39.6	68.9	20
10	11 43.7	73.5	12 23.7	72.7	13 03.3	72.0	13 43.0	71.2	14 22.5	70.4	10
6 00	13 29.4	75.1	14 08.8	74.3	14 48.1	73.5	15 27.3	72.8	16 06.3	72.0	6 00
5 50	15 15.7	76.7	15 54.8	75.9	16 33.7	75.1	17 12.5	74.3	17 51.1	73.5	5 50
40	17 02.9	78.3	17 41.6	77.5	18 20.2	76.7	18 58.5	75.9	19 36.7	75.0	40
30	18 50.4	79.9	19 28.9	79.1	20 07.2	78.2	20 45.2	77.4	21 23.0	76.5	30
20	20 38.7	81.5	21 16.9	80.7	21 54.9	79.8	22 32.7	79.0	23 10.1	78.1	20
10	22 27.4	83.1	23 05.5	82.2	23 43.1	81.4	24 20.5	80.6	24 57.7	79.7	10
5 00	24 16.5	84.7	24 54.3	83.8	25 31.8	83.0	26 09.0	82.1	26 45.9	81.2	5 00
4 50	26 05.8	86.3	26 43.6	85.4	27 20.8	84.6	27 57.8	83.7	28 34.5	82.8	4 50
40	27 55.5	88.0	28 33.0	87.1	29 10.2	86.2	29 47.1	85.3	30 23.5	84.4	40
30	29 45.1	89.7	30 22.7	88.8	30 59.7	87.8	31 36.5	86.9	32 12.7	86.0	30
20	31 34.8	91.4	32 12.3	90.5	32 49.4	89.5	33 26.2	88.6	34 02.4	87.7	20
10	33 24.4	93.1	34 01.9	92.2	34 39.2	91.2	35 15.7	90.3	35 51.9	89.3	10
4 00	35 13.8	94.9	35 51.5	94.0	36 28.7	93.0	37 05.5	92.0	37 41.7	91.0	4 00
3 50	37 02.9	96.8	37 40.8	95.8	38 18.2	94.8	38 55.1	93.8	39 31.3	92.8	3 50
40	38 51.7	98.7	39 29.8	97.7	40 07.4	96.7	40 44.4	95.6	41 20.9	94.6	40
30	40 39.8	100.7	41 18.2	99.6	41 56.1	98.6	42 33.3	97.5	43 10.0	96.5	30
20	42 27.3	102.7	43 06.1	101.6	43 44.3	100.6	44 21.9	99.5	44 58.9	98.4	20
10	44 13.9	104.8	44 53.1	103.7	45 31.7	102.6	46 09.7	101.5	46 47.0	100.4	10
3 00	45 59.4	107.0	46 39.1	105.9	47 18.3	104.8	47 56.9	103.7	48 34.7	102.5	3 00
2 50	47 43.6	109.3	48 24.0	108.2	49 03.8	107.1	49 42.9	106.0	50 21.2	104.8	2 50
40	49 26.3	111.7	50 07.5	110.6	50 48.0	109.5	51 27.8	108.3	52 06.8	107.1	40
30	51 07.2	114.3	51 49.2	113.2	52 30.6	112.0	53 11.1	110.8	53 50.7	109.5	30
20	52 46.1	117.0	53 29.0	115.8	54 11.3	114.6	54 52.9	113.4	55 33.5	112.2	20
10	54 22.6	119.9	55 06.6	118.7	55 49.9	117.5	56 32.5	116.3	57 14.0	115.0	10
2 00	55 56.3	123.0	56 41.4	121.8	57 25.9	120.6	58 09.6	119.3	58 52.4	118.0	2 00
1 50	57 26.5	126.3	58 13.0	125.1	58 58.6	123.9	59 43.6	122.6	60 27.7	121.3	1 50
40	58 52.9	129.8	59 40.7	128.6	60 27.9	127.4	61 14.4	126.1	62 00.1	124.7	40
30	60 14.9	133.7	61 04.1	132.5	61 52.7	131.3	62 40.7	130.0	63 27.9	128.6	30
20	61 31.8	137.6	62 22.6	136.5	63 12.8	135.3	64 02.5	134.0	64 51.4	132.7	20
10	62 42.6	142.0	63 35.0	140.9	64 27.0	139.8	65 18.5	138.6	66 09.0	137.3	10
1 00	63 46.6	146.6	64 40.7	145.6	65 34.3	144.5	66 27.5	143.4	67 20.1	142.2	1 00
0 50	64 43.0	151.6	65 38.6	150.7	66 34.0	149.8	67 28.7	148.8	68 23.1	147.7	0 50
40	65 30.8	156.8	66 27.9	156.0	67 24.7	155.2	68 21.2	154.3	69 17.2	153.4	40
30	66 09.1	162.4	67 07.4	161.7	68 05.5	161.0	69 03.5	160.3	70 01.2	159.6	30
20	66 37.1	168.1	67 36.3	167.7	68 35.5	167.2	69 34.6	166.6	70 33.6	166.2	20
10	66 54.1	174.0	67 54.0	173.8	68 53.9	173.5	69 53.7	173.2	70 53.2	173.0	10
0 00	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	71 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	1 49. 7	91. 7	1 08. 8	92. 4	0 27. 7	93. 2					5 50
40	3 39. 3	93. 4	2 58. 3	94. 1	2 17. 3	94. 9	1 36. 2	95. 6	0 55. 2	96. 3	40
30	5 28. 6	95. 1	4 47. 5	95. 8	4 06. 3	96. 6	3 25. 2	97. 3	2 43. 8	98. 0	30
20	7 17. 8	96. 9	6 36. 5	97. 6	5 55. 2	98. 3	5 13. 7	99. 0	4 32. 3	99. 8	20
10	9 06. 5	98. 6	8 24. 9	99. 3	7 43. 4	100. 0	7 01. 8	100. 7	6 20. 0	101. 5	10
5 00	10 54. 7	100. 4	10 13. 0	101. 1	9 31. 2	101. 8	8 49. 2	102. 5	8 07. 3	103. 3	5 00
4 50	12 42. 2	102. 1	12 00. 2	102. 9	11 18. 1	103. 6	10 35. 9	104. 3	9 53. 6	105. 0	4 50
40	14 29. 1	103. 9	13 46. 8	104. 7	13 04. 4	105. 4	12 21. 8	106. 1	11 39. 2	106. 8	40
30	16 15. 2	105. 7	15 32. 5	106. 5	14 49. 6	107. 2	14 06. 7	107. 9	13 23. 6	108. 6	30
20	18 00. 2	107. 6	17 17. 2	108. 4	16 33. 9	109. 1	15 50. 5	109. 8	15 07. 0	110. 5	20
10	19 44. 2	109. 5	19 00. 6	110. 3	18 16. 8	111. 0	17 33. 0	111. 7	16 48. 9	112. 4	10
4 00	21 26. 9	111. 5	20 42. 9	112. 2	19 58. 7	112. 9	19 14. 3	113. 7	18 29. 7	114. 4	4 00
3 50	23 08. 2	113. 5	22 23. 8	114. 2	21 38. 9	114. 9	20 54. 0	115. 7	20 08. 8	116. 4	3 50
40	24 48. 1	115. 5	24 03. 0	116. 3	23 17. 6	117. 0	22 32. 1	117. 7	21 46. 3	118. 4	40
30	26 26. 2	117. 6	25 40. 5	118. 4	24 54. 4	119. 1	24 08. 2	119. 8	23 21. 8	120. 5	30
20	28 02. 5	119. 8	27 16. 1	120. 5	26 29. 4	121. 2	25 42. 5	121. 9	24 55. 4	122. 6	20
10	29 36. 6	122. 0	28 49. 4	122. 7	28 02. 0	123. 4	27 14. 5	124. 1	26 26. 6	124. 8	10
3 00	31 08. 5	124. 3	30 20. 5	125. 0	29 32. 4	125. 7	28 44. 2	126. 4	27 55. 6	127. 0	3 00
2 50	32 37. 8	126. 7	31 49. 1	127. 4	31 00. 1	128. 1	30 11. 1	128. 7	29 21. 7	129. 3	2 50
40	34 04. 4	129. 1	33 15. 0	129. 8	32 25. 2	130. 5	31 35. 3	131. 1	30 45. 1	131. 7	40
30	35 27. 9	131. 6	34 37. 7	132. 3	33 47. 0	133. 0	32 56. 2	133. 6	32 05. 3	134. 2	30
20	36 48. 3	134. 3	35 57. 0	134. 9	35 05. 7	135. 5	34 14. 1	136. 2	33 22. 3	136. 8	20
10	38 05. 0	137. 0	37 12. 9	137. 6	36 20. 6	138. 2	35 28. 2	138. 8	34 35. 6	139. 4	10
2 00	39 18. 0	139. 8	38 25. 1	140. 4	37 31. 9	141. 0	36 38. 6	141. 5	35 45. 1	142. 1	2 00
1 50	40 26. 6	142. 7	39 32. 7	143. 2	38 38. 8	143. 8	37 44. 7	144. 3	36 50. 3	144. 9	1 50
40	41 31. 0	145. 7	40 36. 3	146. 2	39 41. 5	146. 7	38 46. 4	147. 2	37 51. 3	147. 7	40
30	42 30. 3	148. 7	41 34. 9	149. 2	40 39. 1	149. 7	39 43. 3	150. 2	38 47. 3	150. 7	30
20	43 24. 8	151. 9	42 28. 4	152. 4	41 31. 9	152. 8	40 35. 3	153. 3	39 38. 6	153. 7	20
10	44 13. 6	155. 2	43 16. 5	155. 6	42 19. 2	156. 0	41 21. 8	156. 4	40 24. 4	156. 8	10
1 00	44 56. 7	158. 6	43 58. 9	158. 9	43 01. 0	159. 3	42 03. 1	159. 6	41 05. 0	160. 0	1 00
0 50	45 33. 8	162. 0	44 35. 2	162. 3	43 36. 8	162. 6	42 38. 2	162. 9	41 39. 6	163. 2	0 50
40	46 04. 5	165. 5	45 05. 5	165. 8	44 06. 4	166. 0	43 07. 4	166. 3	42 08. 3	166. 5	40
30	46 28. 6	169. 1	45 29. 2	169. 3	44 29. 8	169. 5	43 30. 3	169. 7	42 30. 8	169. 8	30
20	46 46. 0	172. 7	45 46. 3	172. 8	44 46. 6	173. 0	43 46. 8	173. 1	42 47. 1	173. 2	20
10	46 56. 5	176. 4	45 56. 5	176. 4	44 56. 6	176. 5	43 56. 7	176. 5	42 56. 8	176. 6	10
0 00	47 0. 0	180. 0	46 0. 0	180. 0	45 0. 0	180. 0	44 0. 0	180. 0	43 0. 0	180. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50											5 50
40	0 14.0	97.1									40
30	2 02.6	98.8	1 21.2	99.5	0 39.9	100.2					30
20	3 50.8	100.5	3 09.2	101.2	2 27.7	101.9	1 46.1	102.7	1 04.5	103.4	20
10	5 38.4	102.2	4 56.6	102.9	4 14.6	103.6	3 32.7	104.4	2 50.8	105.1	10
5 00	7 25.2	104.0	6 43.1	104.7	6 00.9	105.4	5 18.6	106.1	4 36.3	106.8	5 00
4 50	9 11.2	105.8	8 28.8	106.5	7 46.1	107.2	7 03.5	107.9	6 20.8	108.6	4 50
40	10 56.4	107.6	10 13.5	108.3	9 30.4	109.0	8 47.3	109.7	8 04.2	110.4	40
30	12 40.4	109.4	11 57.0	110.1	11 13.5	110.8	10 29.9	111.5	9 46.4	112.2	30
20	14 23.3	111.2	13 39.5	112.0	12 55.5	112.7	12 11.4	113.4	11 27.3	114.0	20
10	16 04.8	113.1	15 20.5	113.8	14 36.0	114.5	13 51.4	115.2	13 06.6	115.9	10
4 00	17 45.0	115.1	17 00.1	115.8	16 15.0	116.4	15 29.9	117.1	14 44.6	117.8	4 00
3 50	19 23.6	117.1	18 38.0	117.8	17 52.4	118.4	17 06.6	119.1	16 20.8	119.8	3 50
40	21 00.4	119.1	20 14.3	119.8	19 28.0	120.4	18 41.6	121.1	17 55.1	121.8	40
30	22 35.2	121.1	21 48.5	121.8	21 01.5	122.5	20 14.5	123.1	19 27.2	123.8	30
20	24 08.1	123 2	23 20.7	123.9	22 33.0	124.6	21 45.2	125.2	20 57.3	125.9	20
10	25 38.8	125.4	24 50.5	126.1	24 02.2	126.8	23 13.6	127.4	22 25.0	128.0	10
3 00	27 06.8	127.7	26 17.9	128.3	25 28.8	129.0	24 39.5	129.6	23 50.1	130.2	3 00
2 50	28 32.2	130.0	27 42.5	130.6	26 52.6	131.3	26 02.5	131.9	25 12.4	132.5	2 50
40	29 54.8	132.4	29 04.3	133.0	28 13.6	133.6	27 22.8	134.2	26 31.8	134.8	40
30	31 14.2	134.8	30 22.9	135.4	29 31.3	136.0	28 39.8	136.6	27 48.1	137.2	30
20	32 30.3	137.4	31 38.2	138.0	30 45.8	138.5	29 53.4	139.1	29 00.8	139.6	20
10	33 42.8	140.0	32 49.8	140.6	31 56.6	141.1	31 03.5	141.6	30 10.1	142.1	10
2 00	34 51.4	142.6	33 57.6	143.2	33 03.7	143.7	32 09.6	144.2	31 15.5	144.7	2 00
1 50	35 55.9	145.4	35 01.2	145.9	34 06.5	146.4	33 11.7	146.9	32 16.7	147.4	1 50
40	36 56.0	148.2	36 00.6	148.7	35 05.1	149.2	34 09.4	149.6	33 13.7	150.1	40
30	37 51.3	151.1	36 55.2	151.6	35 58.9	152.0	35 02.6	152.4	34 06.2	152.8	30
20	38 41.8	154.1	37 45.0	154.5	36 48.0	154.9	35 50.9	155.3	34 53.8	155.7	20
10	39 27.0	157.2	38 29.5	157.5	37 31.9	157.9	36 34.2	158.2	35 36.4	158.6	10
1 00	40 06.9	160.3	39 08.7	160.6	38 10.5	160.9	37 12.2	161.2	36 13.9	161.5	1 00
0 50	40 40.9	163.5	39 42.2	163.8	38 43.5	164.0	37 44.7	164.3	36 45.9	164.5	0 50
40	41 09.1	166.7	40 10.0	167.0	39 10.8	167.2	38 11.6	167.4	37 12.4	167.6	40
30	41 31.2	170.0	40 31.8	170.2	39 32.2	170.3	38 32.7	170.5	37 33.1	170.6	30
20	41 47.3	173.3	40 47.5	173.4	39 47.6	173.5	38 47.8	173.7	37 48.0	173.7	20
10	41 56.8	176.6	40 56.8	176.7	39 56.8	176.7	38 57.0	176.8	37 57.0	176.8	10
0 00	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 22.9	104.1									5 20
10	2 08.8	105.8	1 26.8	106.5	0 44.9	107.2	0 02.9	107.9			10
5 00	3 53.9	107.6	3 11.5	108.3	2 29.1	109.0	1 46.7	109.7	1 04.2	110.4	5 00
4 50	5 38.0	109.3	4 55.1	110.0	4 12.3	110.7	3 29.4	111.4	2 46.4	112.1	4 50
40	7 20.9	111.1	6 37.7	111.8	5 54.3	112.5	5 10.9	113.1	4 27.4	113.9	40
30	9 02.7	112.9	8 18.9	113.6	7 35.0	114.3	6 51.1	114.9	6 07.0	115.6	30
20	10 43.0	114.7	9 58.7	115.4	9 14.3	116.1	8 29.8	116.8	7 45.2	117.4	20
10	12 22.0	116.6	11 37.0	117.3	10 52.1	117.9	10 06.9	118.6	9 21.7	119.3	10
4 00	13 59.2	118.5	13 13.7	119.2	12 28.1	119.8	11 42.4	120.5	10 56.6	121.2	4 00
3 50	15 34.7	120.4	14 48.6	121.1	14 02.4	121.7	13 16.0	122.4	12 29.5	123.1	3 50
40	17 08.4	122.4	16 21.6	123.1	15 34.6	123.7	14 47.6	124.4	14 00.4	125.0	40
30	18 39.9	124.4	17 52.4	125.1	17 04.8	125.7	16 17.1	126.4	15 29.1	127.0	30
20	20 09.2	126.5	19 21.0	127.2	18 32.6	127.8	17 44.2	128.4	16 55.6	129.0	20
10	21 36.2	128.7	20 47.2	129.3	19 58.2	129.9	19 08.9	130.5	18 19.7	131.1	10
3 00	23 00.6	130.9	22 10.8	131.5	21 20.9	132.0	20 31.0	132.6	19 40.9	133.2	3 00
2 50	24 22.0	133.1	23 31.5	133.7	22 41.0	134.2	21 50.2	134.8	20 59.4	135.4	2 50
40	25 40.7	135.4	24 49.4	136.0	23 58.0	136.5	23 06.5	137.1	22 14.9	137.6	40
30	26 56.1	137.8	26 04.1	138.3	25 11.8	138.8	24 19.6	139.4	23 27.2	139.9	30
20	28 08.1	140.2	27 15.3	140.7	26 22.3	141.2	25 29.3	141.8	24 36.1	142.3	20
10	29 16.4	142.7	28 22.9	143.2	27 29.2	143.7	26 35.4	144.2	25 41.4	144.7	10
2 00	30 21.2	145.2	29 26.7	145.7	28 32.3	146.2	27 37.7	146.6	26 42.9	147.1	2 00
1 50	31 21.7	147.8	30 26.5	148.3	29 31.3	148.8	28 35.9	149.2	27 40.5	149.6	1 50
40	32 17.9	150.5	31 22.1	150.9	30 26.1	151.4	29 30.0	151.8	28 33.9	152.2	40
30	33 09.7	153.2	32 13.1	153.6	31 16.4	154.0	30 19.8	154.4	29 22.9	154.8	30
20	33 56.6	156.0	32 59.4	156.4	32 02.1	156.8	31 04.7	157.1	30 07.3	157.4	20
10	34 38.7	158.9	33 40.7	159.2	32 43.0	159.5	31 44.9	159.8	30 47.0	160.1	10
1 00	35 15.5	161.8	34 17.1	162.1	33 18.7	162.4	32 20.3	162.6	31 21.8	162.9	1 00
0 50	35 47.1	164.8	34 48.2	165.0	33 49.3	165.3	32 50.4	165.5	31 51.5	165.7	0 50
40	36 13.1	167.8	35 13.9	168.0	34 14.6	168.2	33 15.3	168.3	32 15.9	168.5	40
30	36 33.6	170.8	35 34.0	170.9	34 34.4	171.1	33 34.8	171.2	32 35.1	171.3	30
20	36 48.2	173.8	35 48.4	173.9	34 48.6	174.0	33 48.8	174.1	32 48.9	174.2	20
10	36 57.1	176.9	35 57.1	177.0	34 57.2	177.0	33 57.2	177.1	32 57.2	177.1	10
0 00	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 21.8	111.1									5 00
4 50	2 03.5	112.8	1 20.5	113.5	0 37.5	114.2					4 50
40	3 44.0	114.6	3 00.4	115.3	2 16.9	115.9	1 33.3	116.6	0 49.8	117.3	40
30	5 23.0	116.3	4 38.9	117.0	3 54.8	117.7	3 10.6	118.3	2 26.5	119.0	30
20	7 00.6	118.1	6 15.9	118.8	5 31.2	119.5	4 46.4	120.1	4 01.6	120.8	20
10	8 36.1	119.9	7 50.9	120.6	7 05.7	121.3	6 20.3	121.9	5 35.0	122.6	10
4 00	10 10.7	121.8	9 24.7	122.5	8 38.7	123.1	7 52.5	123.8	7 06.4	124.4	4 00
3 50	11 42.9	123.7	10 56.4	124.4	10 09.7	125.0	9 22.8	125.6	8 35.8	126.2	3 50
40	13 13.2	125.6	12 25.8	126.3	11 38.4	126.9	10 50.9	127.5	10 03.3	128.1	40
30	14 41.2	127.6	13 53.1	128.2	13 05.1	128.8	12 16.7	129.4	11 28.5	130.0	30
20	16 07.0	129.6	15 18.2	130.2	14 29.3	130.8	13 40.3	131.4	12 51.2	132.0	20
10	17 30.1	131.7	16 40.6	132.3	15 50.9	132.9	15 01.1	133.4	14 11.5	134.0	10
3 00	18 50.7	133.8	18 00.5	134.4	17 10.1	135.0	16 19.6	135.5	15 29.0	136.1	3 00
2 50	20 09.4	136.0	19 17.4	136.5	18 26.1	137.1	17 34.9	137.6	16 43.6	138.2	2 50
40	21 23.1	138.2	20 31.3	138.7	19 39.3	139.3	18 47.3	139.8	17 55.2	140.3	40
30	22 34.7	140.5	21 42.1	141.0	20 49.4	141.5	19 56.5	142.0	19 03.7	142.5	30
20	23 42.8	142.8	22 49.4	143.3	21 55.9	143.8	21 02.4	144.2	20 08.7	144.7	20
10	24 47.3	145.1	23 53.3	145.6	22 59.0	146.1	22 04.8	146.5	21 10.3	147.0	10
2 00	25 48.1	147.6	24 53.3	148.0	23 58.3	148.5	23 03.4	148.9	22 08.3	149.3	2 00
1 50	26 45.0	150.1	25 49.4	150.5	24 53.9	150.9	23 58.1	151.3	23 02.2	151.7	1 50
40	27 37.7	152.6	26 41.4	153.0	25 45.1	153.4	24 48.7	153.7	23 52.2	154.1	40
30	28 26.0	155.1	27 29.1	155.5	26 32.1	155.9	25 35.1	156.2	24 38.2	156.6	30
20	29 09.9	157.8	28 12.3	158.1	27 14.8	158.4	26 17.2	158.7	25 19.6	159.0	20
10	29 49.0	160.4	28 50.9	160.7	27 52.9	161.0	26 54.7	161.3	25 56.6	161.6	10
1 00	30 23.3	163.2	29 24.7	163.4	28 26.1	163.7	27 27.5	163.9	26 28.9	164.1	1 00
0 50	30 52.6	165.9	29 53.6	166.1	28 54.6	166.3	27 55.5	166.5	26 56.5	166.7	0 50
40	31 16.6	168.7	30 17.3	168.9	29 17.9	169.0	28 18.6	169.2	27 19.2	169.4	40
30	31 35.6	171.5	30 36.0	171.6	29 36.2	171.7	28 36.7	171.9	27 37.0	172.0	30
20	31 49.1	174.3	30 49.3	174.4	29 49.5	174.5	28 49.7	174.6	27 49.8	174.7	20
10	31 57.2	177.2	30 57.2	177.2	29 57.4	177.2	28 57.4	177.3	27 57.5	177.3	10
0 00	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	0 06.2	118.0									4 40
30	1 42.2	119.7	0 59.1	120.4	0 13.8	121.0					30
20	3 16.7	121.5	2 31.8	122.2	1 46.9	122.8	1 02.1	123.5	0 17.2	124.1	20
10	4 49.3	123.3	4 03.8	123.9	3 18.2	124.5	2 32.6	125.2	1 47.0	125.8	10
4 00	6 20.2	125.1	5 33.9	125.7	4 47.7	126.3	4 01.3	127.0	3 15.0	127.6	4 00
3 50	7 49.0	126.9	7 02.1	127.5	6 15.0	128.1	5 28.0	128.8	4 40.8	129.4	3 50
40	9 15.6	128.8	8 27.9	129.4	7 40.2	130.0	6 52.4	130.6	6 04.6	131.2	40
30	10 40.1	130.7	9 51.6	131.3	9 03.1	131.9	8 14.5	132.4	7 25.8	133.0	30
20	12 02.1	132.6	11 12.9	133.2	10 23.7	133.8	9 34.3	134.3	8 44.9	134.9	20
10	13 21.6	134.6	12 31.6	135.2	11 41.5	135.7	10 51.3	136.3	10 01.2	136.8	10
3 00	14 38.3	136.6	13 47.6	137.2	12 56.8	137.7	12 05.9	138.3	11 14.9	138.8	3 00
2 50	15 52.2	138.7	15 00.7	139.2	14 09.1	139.7	13 17.4	140.3	12 25.7	140.8	2 50
40	17 03.0	140.8	16 10.7	141.3	15 18.4	141.8	14 26.0	142.3	13 33.5	142.8	40
30	18 10.6	143.0	17 17.7	143.5	16 24.6	143.9	15 31.3	144.4	14 38.1	144.9	30
20	19 15.0	145.2	18 21.3	145.7	17 27.5	146.1	16 33.6	146.6	15 39.6	147.0	20
10	20 16.0	147.4	19 21.4	147.9	18 26.8	148.3	17 32.2	148.8	16 37.5	149.2	10
2 00	21 13.1	149.7	20 17.9	150.2	19 22.6	150.6	18 27.3	151.0	17 31.9	151.4	2 00
1 50	22 06.4	152.1	21 10.6	152.5	20 14.6	152.9	19 18.6	153.2	18 22.6	153.6	1 50
40	22 55.7	154.5	21 59.2	154.8	21 02.7	155.2	20 06.1	155.5	19 09.4	155.9	40
30	23 41.0	156.9	22 43.8	157.2	21 46.6	157.5	20 49.4	157.8	19 52.2	158.2	30
20	24 21.9	159.3	23 24.2	159.6	22 26.5	159.9	21 28.7	160.2	20 30.9	160.5	20
10	24 58.4	161.8	24 00.2	162.1	23 01.9	162.3	22 03.7	162.6	21 05.3	162.9	10
1 00	25 30.2	164.4	24 31.6	164.6	23 32.9	164.8	22 34.2	165.1	21 35.5	165.3	1 00
0 50	25 57.4	166.9	24 58.4	167.1	23 59.3	167.3	23 00.2	167.5	22 01.1	167.7	0 50
40	26 19.8	169.5	25 20.5	169.7	24 21.1	169.8	23 21.7	170.0	22 22.3	170.1	40
30	26 37.4	172.1	25 37.7	172.2	24 38.1	172.3	23 38.4	172.4	22 38.7	172.5	30
20	26 50.0	174.7	25 50.2	174.8	24 50.3	174.9	23 50.5	175.0	22 50.6	175.0	20
10	26 57.5	177.3	25 57.5	177.4	24 57.6	177.4	23 57.6	177.5	22 57.7	177.5	10
0 00	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 17.2	86.1	0 59.0	85.4	6 10
6 00	0 00.0	90.0	0 41.7	89.3	1 23.4	88.6	2 05.1	87.8	2 46.7	87.1	6 00
5 50	1 47.9	91.7	2 29.6	91.0	3 11.2	90.3	3 52.9	89.5	4 34.5	88.8	5 50
40	3 35.6	93.5	4 17.4	92.8	4 59.1	92.1	5 40.8	91.3	6 22.4	90.6	40
30	5 23.2	95.2	6 05.2	94.5	6 46.8	93.8	7 28.6	93.0	8 10.2	92.3	30
20	7 10.5	97.0	7 52.5	96.3	8 34.4	95.6	9 16.2	94.8	9 57.9	94.1	20
10	8 57.4	98.8	9 39.6	98.0	10 21.6	97.3	11 03.6	96.6	11 45.5	95.8	10
5 00	10 43.8	100.6	11 26.2	99.8	12 08.5	99.1	12 50.7	98.4	13 32.7	97.6	5 00
4 50	12 29.6	102.4	13 12.2	101.6	13 54.7	100.9	14 37.0	100.2	15 19.3	99.4	4 50
40	14 14.6	104.2	14 57.5	103.5	15 40.4	102.7	16 23.0	102.0	17 05.5	101.3	40
30	15 58.7	106.1	16 42.1	105.4	17 25.1	104.6	18 08.1	103.9	18 50.9	103.1	30
20	17 41.9	108.0	18 25.6	107.3	19 09.1	106.5	19 52.5	105.8	20 35.6	105.0	20
10	19 24.0	109.9	20 08.0	109.2	20 51.9	108.4	21 35.6	107.7	22 19.2	106.9	10
4 00	21 04.7	111.9	21 49.3	111.2	22 33.7	110.4	23 18.0	109.7	24 02.0	108.9	4 00
3 50	22 44.2	113.9	23 29.4	113.2	24 14.2	112.4	24 58.9	111.7	25 43.4	110.9	3 50
40	24 22.1	116.0	25 07.7	115.2	25 53.2	114.5	26 38.4	113.8	27 23.4	113.0	40
30	25 58.2	118.1	26 44.6	117.3	27 30.5	116.6	28 16.3	115.9	29 01.9	115.2	30
20	27 32.5	120.2	28 19.4	119.5	29 06.1	118.8	29 52.5	118.1	30 38.7	117.4	20
10	29 04.6	122.5	29 52.2	121.8	30 39.6	121.1	31 26.6	120.4	32 13.6	119.7	10
3 00	30 34.4	124.8	31 22.7	124.1	32 10.8	123.4	32 58.7	122.7	33 46.3	122.0	3 00
2 50	32 01.6	127.2	32 50.8	126.5	33 39.6	125.8	34 28.2	125.1	35 16.5	124.4	2 50
40	33 26.4	129.6	34 16.2	129.0	35 05.8	128.3	35 55.2	127.6	36 44.3	126.9	40
30	34 47.9	132.2	35 38.6	131.5	36 29.0	130.9	37 19.2	130.2	38 09.1	129.5	30
20	36 06.2	134.8	36 57.7	134.1	37 49.0	133.5	38 40.1	132.8	39 30.9	132.1	20
10	37 21.0	137.5	38 13.3	136.9	39 05.5	136.3	39 57.3	135.6	40 49.1	134.9	10
2 00	38 32.0	140.3	39 25.2	139.7	40 18.2	139.1	41 11.0	138.4	42 03.6	137.8	2 00
1 50	39 38.8	143.2	40 32.9	142.6	41 26.8	142.0	42 20.5	141.4	43 13.9	140.8	1 50
40	40 41.3	146.1	41 36.2	145.6	42 30.9	145.1	43 25.5	144.5	44 19.9	143.9	40
30	41 39.0	149.2	42 34.8	148.7	43 30.3	148.2	44 25.8	147.6	45 21.0	147.0	30
20	42 31.7	152.4	43 28.2	151.9	44 24.6	151.4	45 20.9	150.9	46 17.0	150.4	20
10	43 19.0	155.6	44 16.4	155.2	45 13.4	154.7	46 10.4	154.3	47 07.4	153.8	10
1 00	44 00.9	158.9	44 58.7	158.6	45 56.7	158.2	46 54.4	157.8	47 52.1	157.4	1 00
0 50	44 36.7	162.3	45 35.2	162.0	46 33.6	161.7	47 31.9	161.4	48 30.3	161.0	0 50
40	45 06.4	165.8	46 05.4	165.5	47 04.4	165.3	48 03.4	165.0	49 02.3	164.7	40
30	45 29.7	169.3	46 29.1	169.1	47 28.5	168.9	48 27.9	168.7	49 27.3	168.4	30
20	45 46.5	172.8	46 46.3	172.7	47 46.0	172.6	48 45.8	172.4	49 45.5	172.3	20
10	45 56.6	176.4	46 56.6	176.3	47 56.5	176.3	48 56.4	176.2	49 56.4	176.2	10
0 00	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 12.8	79.0	0 54.8	78.4	6 30
20			0 35.3	82.2	1 17.2	81.5	1 59.0	80.8	2 40.8	80.1	20
10	1 40.8	84.7	2 22.4	83.9	3 04.1	83.2	3 45.8	82.5	4 27.4	81.8	10
6 00	3 28.3	86.4	4 09.9	85.7	4 51.4	85.0	5 32.9	84.2	6 14.4	83.5	6 00
5 50	5 16.0	88.1	5 57.6	87.4	6 39.0	86.7	7 20.5	85.9	8 01.8	85.2	5 50
40	7 03.9	89.9	7 45.4	89.1	8 26.8	88.4	9 08.1	87.7	9 49.3	86.9	40
30	8 51.8	91.6	9 33.4	90.8	10 14.6	90.1	10 56.0	89.4	11 37.2	88.6	30
20	10 39.6	93.4	11 21.1	92.6	12 02.6	91.9	12 43.9	91.1	13 25.1	90.4	20
10	12 27.2	95.1	13 08.9	94.4	13 50.4	93.6	14 31.8	92.9	15 13.1	92.1	10
5 00	14 14.6	96.9	14 56.3	96.2	15 38.0	95.4	16 19.4	94.7	17 00.7	93.9	5 00
4 50	16 01.4	98.7	16 43.4	98.0	17 25.2	97.2	18 06.8	96.4	18 48.2	95.7	4 50
40	17 47.8	100.6	18 30.0	99.8	19 12.0	99.0	19 53.8	98.2	20 35.4	97.5	40
30	19 33.6	102.4	20 16.0	101.6	20 58.3	100.9	21 40.4	100.1	22 22.2	99.3	30
20	21 18.6	104.3	22 01.3	103.5	22 43.9	102.8	23 26.2	102.0	24 08.3	101.2	20
10	23 02.6	106.2	23 45.8	105.4	24 28.7	104.7	25 11.3	103.9	25 53.8	103.1	10
4 00	24 45.8	108.2	25 29.3	107.4	26 12.6	106.7	26 55.6	105.9	27 38.4	105.1	4 00
3 50	26 27.6	110.2	27 11.6	109.4	27 55.5	108.7	28 38.8	107.9	29 22.1	107.1	3 50
40	28 08.2	112.3	28 52.7	111.5	29 37.0	110.8	30 21.0	110.0	31 04.7	109.2	40
30	29 47.2	114.4	30 32.4	113.6	31 17.2	112.9	32 01.6	112.1	32 45.9	111.3	30
20	31 24.6	116.6	32 10.3	115.8	32 55.7	115.1	33 40.8	114.3	34 25.6	113.5	20
10	33 00.2	118.9	33 46.5	118.1	34 32.6	117.4	35 18.2	116.6	36 03.8	115.8	10
3 00	34 33.6	121.2	35 20.6	120.4	36 07.4	119.7	36 53.8	118.9	37 39.9	118.1	3 00
2 50	36 04.7	123.6	36 52.4	122.9	37 40.0	122.1	38 27.1	121.3	39 14.1	120.5	2 50
40	37 33.2	126.1	38 21.8	125.4	39 10.1	124.6	39 58.1	123.8	40 45.8	123.0	40
30	38 58.8	128.7	39 48.3	128.0	40 37.5	127.2	41 26.4	126.5	42 14.9	125.7	30
20	40 21.5	131.4	41 11.8	130.7	42 01.8	130.0	42 51.5	129.2	43 40.9	128.4	20
10	41 40.6	134.2	42 31.8	133.6	43 22.7	132.9	44 13.4	132.1	45 03.9	131.3	10
2 00	42 56.0	137.1	43 48.1	136.5	44 40.0	135.8	45 31.6	135.0	46 23.0	134.3	2 00
1 50	44 07.1	140.2	45 00.3	139.6	45 53.2	138.9	46 45.8	138.1	47 38.2	137.4	1 50
40	45 14.1	143.3	46 08.2	142.7	47 02.0	142.0	47 55.6	141.4	48 48.9	140.7	40
30	46 16.1	146.5	47 11.1	146.0	48 05.9	145.4	49 00.5	144.8	49 54.9	144.1	30
20	47 13.0	149.9	48 08.9	149.4	49 04.6	148.8	50 00.1	148.2	50 55.4	147.6	20
10	48 04.2	153.4	49 01.1	152.9	49 57.6	152.4	50 54.0	151.8	51 50.3	151.3	10
1 00	48 49.7	156.9	49 47.2	156.5	50 44.6	156.1	51 41.9	155.6	52 39.1	155.1	1 00
0 50	49 28.8	160.6	50 27.0	160.2	51 25.0	159.8	52 23.1	159.4	53 21.0	159.0	0 50
40	50 01.2	164.4	51 00.0	164.1	51 58.8	163.8	52 57.5	163.4	53 56.2	163.1	40
30	50 26.6	168.2	51 26.1	168.0	52 25.4	167.7	53 24.7	167.4	54 23.9	167.2	30
20	50 45.2	172.1	51 44.9	172.0	52 44.6	171.8	53 44.2	171.6	54 43.9	171.4	20
10	50 56.2	176.1	51 56.2	176.0	52 56.1	175.9	53 56.0	175.8	54 56.0	175.7	10
0 00	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 15.7	72.1	0 59.0	71.3	6 50
40			0 34.2	75.2	1 16.5	74.5	1 58.8	73.8	2 41.2	73.1	40
30	1 36.9	77.6	2 18.9	76.9	3 00.9	76.2	3 42.9	75.5	4 24.8	74.8	30
20	3 22.6	79.4	4 04.4	78.6	4 46.1	77.9	5 27.8	77.2	6 09.4	76.5	20
10	5 08.9	81.1	5 50.4	80.3	6 31.9	79.6	7 13.1	78.9	7 54.7	78.1	10
6 00	6 55.7	82.8	7 37.1	82.0	8 18.3	81.3	8 59.4	80.6	9 40.5	79.8	6 00
5 50	8 43.0	84.5	9 24.1	83.7	10 05.2	83.0	10 46.1	82.3	11 27.0	81.5	5 50
40	10 30.5	86.2	11 11.5	85.4	11 52.4	84.7	12 33.2	84.0	13 13.9	83.2	40
30	12 18.2	87.9	12 59.2	87.2	13 39.9	86.4	14 20.7	85.7	15 01.1	84.9	30
20	14 06.1	89.6	14 47.1	88.9	15 27.8	88.1	16 08.4	87.4	16 48.8	86.6	20
10	15 54.0	91.3	16 35.0	90.6	17 15.6	89.8	17 56.2	89.1	18 36.6	88.3	10
5 00	17 41.9	93.1	18 22.8	92.4	19 03.6	91.6	19 44.1	90.8	20 24.5	90.0	5 00
4 50	19 29.5	94.9	20 10.5	94.2	20 51.4	93.4	21 32.0	92.6	22 12.4	91.8	4 50
40	21 16.8	96.7	21 58.0	96.0	22 38.9	95.2	23 19.6	94.4	24 00.1	93.6	40
30	23 03.7	98.5	23 45.2	97.8	24 26.2	97.0	25 07.1	96.2	25 47.8	95.4	30
20	24 50.1	100.4	25 31.8	99.6	26 13.1	98.8	26 54.2	98.0	27 35.0	97.2	20
10	26 35.9	102.3	27 17.9	101.5	27 59.4	100.7	28 40.8	99.9	29 21.8	99.1	10
4 00	28 20.9	104.3	29 03.2	103.5	29 45.1	102.7	30 26.7	101.8	31 08.0	101.0	4 00
3 50	30 05.0	106.3	30 47.7	105.5	31 29.9	104.7	32 11.9	103.8	32 53.6	103.0	3 50
40	31 48.0	108.4	32 31.1	107.5	33 13.8	106.7	33 56.2	105.8	34 38.3	105.0	40
30	33 29.7	110.5	34 13.4	109.6	34 56.6	108.8	35 39.5	107.9	36 21.9	107.1	30
20	35 10.1	112.7	35 54.2	111.8	36 38.0	111.0	37 21.4	110.1	38 04.5	109.2	20
10	36 48.8	115.0	37 33.7	114.1	38 18.0	113.3	39 02.0	112.4	39 45.8	111.5	10
3 00	38 25.8	117.3	39 11.2	116.4	39 56.3	115.6	40 41.0	114.7	41 25.3	113.8	3 00
2 50	40 00.6	119.7	40 46.9	118.9	41 32.5	118.0	42 18.5	117.1	43 03.0	116.2	2 50
40	41 33.2	122.2	42 20.2	121.4	43 06.8	120.5	43 53.0	119.7	44 38.8	118.8	40
30	43 03.0	124.9	43 50.9	124.1	44 38.4	123.2	45 25.4	122.3	46 12.2	121.4	30
20	44 30.1	117.6	45 18.9	126.8	46 07.3	126.0	46 55.3	125.1	47 42.9	124.2	20
10	45 53.9	130.5	46 43.6	129.7	47 33.0	128.9	48 21.9	128.0	49 10.6	127.2	10
2 00	47 14.0	133.5	48 04.8	132.7	48 55.2	131.9	49 45.2	131.1	50 34.9	130.2	2 00
1 50	48 30.2	136.7	49 22.0	135.9	50 13.4	135.1	51 04.6	134.3	51 55.1	133.4	1 50
40	49 42.0	140.0	50 34.9	139.2	51 27.4	138.4	52 19.6	137.6	53 11.5	136.8	40
30	50 49.0	143.4	51 42.8	142.7	52 36.3	142.0	53 29.7	141.2	54 22.8	140.4	30
20	51 50.6	147.0	52 45.5	146.3	53 40.2	145.6	54 34.6	144.9	55 28.8	144.2	20
10	52 46.4	150.7	53 42.4	150.1	54 38.1	149.5	55 33.7	148.8	56 29.0	148.1	10
1 00	53 36.1	154.6	54 33.0	154.0	55 29.7	153.5	56 26.3	152.9	57 22.6	152.2	1 00
0 50	54 18.9	158.6	55 16.7	158.1	56 14.2	157.5	57 11.9	157.0	58 09.8	156.5	0 50
40	54 54.8	162.7	55 53.3	162.2	56 51.8	161.7	57 50.1	161.4	58 48.4	161.0	40
30	55 23.0	166.9	56 22.2	166.6	57 21.2	166.2	58 21.0	165.9	59 19.2	165.6	30
20	55 43.5	171.3	56 43.1	171.0	57 42.7	170.8	58 42.3	170.6	59 41.8	170.3	20
10	55 55.9	175.6	56 55.7	175.5	57 55.5	175.4	58 55.5	175.3	59 55.4	175.2	10
0 00	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10							0 30.8	65.1	1 14.4	64.4	7 10
7 00			0 43.0	68.2	1 26.2	67.5	2 09.3	66.8	2 52.4	66.1	7 00
6 50	1 41.1	70.6	2 23.8	70.0	3 06.7	69.2	3 49.1	68.5	4 31.7	67.8	6 50
40	3 23.5	72.3	4 05.7	71.6	4 47.9	70.9	5 30.1	70.2	6 12.2	69.5	40
30	5 06.7	74.0	5 48.6	73.3	6 30.3	72.6	7 12.1	71.9	7 53.7	71.2	30
20	6 50.9	75.7	7 32.4	75.0	8 13.8	74.3	8 55.1	73.6	9 36.4	72.8	20
10	8 35.9	77.4	9 17.0	76.7	9 58.0	75 9	10 39.1	75.2	11 20.0	74.5	10
6 00	10 21.5	79.1	11 02.3	78.4	11 43.1	77.6	12 23.8	76.9	13 04.3	76.1	6 00
5 50	12 07.8	80.8	12 48.3	80.0	13 28.7	79.2	14 09.1	78.5	14 49.3	77.7	5 50
40	13 54.4	82.4	14 34.8	81.7	15 15.1	80.9	15 55.2	80.1	16. 35.1	79.3	40
30	15 41.6	84.1	16 21.8	83.3	17 01.8	82.6	17 41.8	81.8	18 21.4	81.0	30
20	17 29.1	85.8	18 09.2	85.0	18 49.1	84.2	19 28.8	83.5	20 08.3	82.7	20
10	19 16.8	87.5	19 56.8	86.7	20 36.6	85.9	21 16.1	85.1	21 55.4	84.3	10
5 00	21 04.6	89.2	21 44.5	88.4	22 24.2	87.6	23 03.7	86.8	23 43.0	86.0	5 00
4 50	22 52.6	91.0	23 32.4	90.1	24 12.1	89.3	24 51.7	88.5	25 30.7	87.7	4 50
40	24 40.4	92.7	25 20.3	91.9	26 00.0	91.1	26 39.4	90.2	27 18.5	89.4	40
30	26 28.1	94.5	27 08.1	93.7	27 47.8	92.8	28 27.2	92.0	29 06.4	91.1	30
20	28 15.5	96.3	28 55.7	95.5	29 35.6	94.6	30 15.1	93.8	30 54.3	92.9	20
10	30 02.5	98.2	30 42.7	97.4	31 22.9	96.5	32 02.6	95.6	32 41.8	94.7	10
4 00	31 49.0	100.1	32 29.6	99.3	33 09.9	98.4	33 49.7	97.5	34 29.2	96.6	4 00
3 50	33 35.0	102.1	34 15.8	101.2	34 56.3	100.3	35 36.6	99.4	36 16.2	98.5	3 50
40	35 20.0	104.1	36 01.3	103.2	36 42.2	102.3	37 22.7	101.4	38 02.7	100.4	40
30	37 04.9	106.2	37 45.9	105.3	38 27.2	104.4	39 08.1	103.4	39 48.4	102.5	30
20	38 47.2	108.3	39 29.4	107.4	40 11.2	106.5	40 52.5	105.5	41 33.4	104.6	20
10	40 29.0	110.6	41 11.7	109.6	41 53.9	108.7	42 35.9	107.7	43 17.2	106.7	10
3 00	42 09.2	112.9	42 52.6	111.9	43 35.5	111.0	44 18.0	110.0	45 00.0	109.0	3 00
2 50	43 47.7	115.3	44 31.8	114.4	45 15.5	113.4	45 58.6	112.4	46 41.2	111.4	2 50
40	45 24.2	117.8	46 09.1	116.9	46 53.5	115.9	47 37.4	114.9	48 20.8	113.9	40
30	46 58.4	120.5	47 44.1	119.6	48 29.4	118.6	49 14.2	117.6	49 58.4	116.6	30
20	48 30.1	123.3	49 16.8	122.3	50 03.0	121.3	50 48.7	120.3	51 33.9	119.3	20
10	49 58.7	126.2	50 46.5	125.3	51 33.8	124.3	52 20.5	123.3	53 06.6	122.2	10
2 00	51 24.2	129.3	52 12.9	128.3	53 01.2	127.3	53 49.1	126.3	54 36.4	125.3	2 00
1 50	52 45.8	132.5	53 35.6	131.6	54 25.0	130.6	55 14.1	129.6	56 02.6	128.6	1 50
40	54 03.0	136.0	54 54.1	135.1	55 44.8	134.1	56 35.1	133.1	57 24.9	132.1	40
30	55 15.7	139.6	56 07.8	138.8	56 59.7	137.8	57 51.4	136.8	58 42.5	135.8	30
20	56 22.8	143.4	57 16.3	142.6	58 09.6	141.7	59 02.5	140.8	59 55.1	139.9	20
10	57 24.2	147.4	58 18.9	146.7	59 13.4	145.9	60 07.5	145.0	61 01.4	144.1	10
1 00	58 18.9	151.6	59 14.8	150.9	60 10.5	150.2	61 06.1	149.4	62 01.3	148.6	1 00
0 50	59 06.5	156.0	60 03.5	155.4	61 00.5	154.8	61 57.2	154.1	62 53.7	153.3	0 50
40	59 46 6	160.5	60 44.6	160.0	61 42.6	159.5	62 40.4	158.9	63 38.1	158.3	40
30	60 18.5	165.3	61 17.2	164.9	62 16.0	164.4	63 14.9	163.9	64 13.2	163.5	30
20	60 41.3	170.1	61 40.8	169.8	62 40.3	169.5	63 39.7	169.2	64 39.1	168.9	20
10	60 55.4	175.0	61 55.1	174.9	62 55.0	174.7	63 54.9	174.5	64 54.7	174.4	10
0 00	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40									0 16.5	55.9	7 40
30					0 17.1	59.0	1 02.0	58.3	1 46.9	57.6	30
20	0 22.0	62.0	1 06.1	61.3	1 50.2	60.7	2 34.3	60.0	3 18.4	59.3	20
10	1 58.0	63.7	2 41.7	63.0	3 25.2	62.3	4 08.7	61.6	4 52.4	60.9	10
7 00	3 35.5	65.4	4 18.6	64.7	5 01.6	64.0	5 44.5	63.3	6 27.4	62.6	7 00
6 50	5 14.2	67.1	5 56.8	66.4	6 39.2	65.7	7 21.6	65.0	8 04.1	64.2	6 50
40	6 54.2	68.8	7 36.2	68.1	8 18.1	67.4	9 00.0	66.6	9 41.7	65.9	40
30	8 35.3	70.4	9 17.0	69.7	9 58.3	69.0	10 39.7	68.3	11 21.0	67.5	30
20	10 17.5	72.1	10 58.6	71.3	11 39.5	70.6	12 20.4	69.9	13 01.1	69.1	20
10	12 00.7	73.7	12 41.3	72.9	13 21.7	72.2	14 02.2	71.4	14 42.5	70.7	10
6 00	13 44.7	75.3	14 24.7	74.6	15 05.0	73.8	15 45.0	73.0	16 24.7	72.2	6 00
5 50	15 29.4	76.9	16 09.3	76.2	16 49.0	75.4	17 28.7	74.6	18 08.0	73.8	5 50
40	17 14.9	78.6	17 54.5	77.8	18 33.9	77.0	19 13.0	76.2	19 52.0	75.4	40
30	19 00.8	80.2	19 40.2	79.4	20 19.2	78.6	20 58.1	77.8	21 36.8	76.9	30
20	20 47.5	81.8	21 26.5	81.0	22 05.4	80.2	22 43.9	79.4	23 22.2	78.5	20
10	22 34.5	83.5	23 13.3	82.7	23 52.0	81.8	24 30.2	81.0	25 08.2	80.1	10
5 00	24 21.9	85.2	25 00.6	84.3	25 38.9	83.5	26 17.1	82.6	26 54.8	81.8.	5 00
4 50	26 09.3	86.8	26 48.1	86.0	27 26.2	85.1	28 04.2	84.2	28 41.7	83.4	4 50
40	27 57.3	88.5	28 35.8	87.7	29 13.9	86.8	29 51.7	85.9	30 29.1	85.0	40
30	29 45.2	90.2	30 23.6	89.4	31 01.7	88.5	31 39.4	87.5	32 16.7	86.6	30
20	31 33.1	92.0	32 11.5	91.1	32 49.6	90.2	33 27.3	89.2	34 04.5	88.3	20
10	33 20.7	93.8	33 59.3	92.9	34 37.4	91.9	35 15.1	91.0	35 52.3	90.0	10
4 00	35 08.3	95.6	35 46.9	94.7	36 25.2	93.7	37 03.0	92.8	37 49.2	91.8	4 00
3 50	36 55.6	97.5	37 34.4	96.6	38 12.7	95.6	38 50.6	94.6	39 28.1	93.6	3 50
40	38 42.3	99.5	39 21.4	98.5	40 00.0	97.5	40 38.1	96.5	41 15.6	95.5	40
30	40 28.3	101.5	41 07.7	100.5	41 46.7	99.5	42 25.0	98.4	43 02.8	97.4	30
20	42 13.7	103.6	42 53.5	102.5	43 32.8	101.5	44 11.5	100.4	44 49.6	99.4	20
10	43 58.0	105.8	44 38.3	104.7	45 18.0	103.6	45 57.1	102.5	46 36.7	101.4	10
3 00	45 41.4	108.0	46 22.2	106.9	47 02.5	105.8	47 42.2	104.7	48 21.1	103.6	3 00
2 50	47 23.3	110.3	48 04.7	109.3	48 45.5	108.2	49 25.9	107.0	50 05.3	105.9	2 50
40	49 03.6	112.8	49 45.8	111.7	50 27.4	110.6	51 08.4	109.4	51 48.6	108.3	40
30	50 42.1	115.5	51 25.1	114.4	52 07.5	113.2	52 49.3	112.0	53 30.2	110.8	30
20	52 18.4	118.2	53 02.3	117.1	53 45.7	115.9	54 28.4	114.7	55 10.2	113.5	20
10	53 51.9	121.1	54 37.1	120.0	55 21.6	118.9	56 05.2	117.6	56 48.1	116.4	10
2 00	55 23.1	124.2	56 09.2	123.1	56 54.8	121.9	57 39.6	120.7	58 23.6	119.4	2 00
1 50	56 50.5	127.5	57 37.9	126.4	58 24.6	125.2	59 10.6	124.0	59 56.1	122.7	1 50
40	58 14.1	131.0	59 02.8	129.9	59 50.9	128.7	60 38.4	127.5	61 25.1	126.2	40
30	59 33.2	134.8	60 23.2	133.7	61 12.6	132.5	62 01.5	131.3	62 50.0	130.1	30
20	60 47.1	138.8	61 38.6	137.7	62 29.6	136.6	63 20.2	135.4	64 10.0	134.2	20
10	61 55.0	143.2	62 48.0	142.2	63 40.7	141.1	64 32.9	140.0	65 24.4	138.8	10
1 00	62 56.2	147.7	63 50.8	146.8	64 45.0	145.8	65 38.9	144.7	66 32.2	143.6	1 00
0 50	63 50.0	152.5	64 46.0	151.7	65 41.6	150.9	66 37.0	150.0	67 32.2	148.9	0 50
40	64 35.6	157.6	65 32.9	156.9	66 30.0	156.2	67 26.9	155.4	68 23.5	154.5	40
30	65 11.9	163.0	66 10.1	162.5	67 08.6	161.9	68 06.6	161.2	69 04.8	160.5	30
20	65 38.4	168.5	66 37.7	168.2	67 36.9	167.8	68 36.1	167.3	69 35.2	166.8	20
10	65 54.5	174.2	66 54.2	174.0	67 54.1	173.8	68 54.0	173.6	69 53.9	173.3	10
0 00	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	70 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

37° 40.2

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 47.9	91.7	1 06.2	92.5	0 24.5	93.2					5 50
40	3 35.6	93.5	2 53.9	94.2	2 12.1	94.9	1 30.3	95.6	0 48.5	96.4	40
30	5 23.2	95.2	4 41.4	95.9	3 59.4	96.6	3 17.5	97.3	2 35.4	98.1	30
20	7 10.5	97.0	6 28.5	97.7	5 46.4	98.4	5 04.2	99.1	4 22.0	99.9	20
10	8 57.4	98.8	8 15.2	99.5	7 32.9	100.2	6 50.6	100.9	6 08.1	101.6	10
5 00	10 43.8	100.6	10 01.3	101.3	9 18.8	102.0	8 36.1	102.7	7 53.4	103.4	5 00
4 50	12 29.6	102.4	11 46.8	103.1	11 03.9	103.8	10 21.0	104.5	9 38.0	105.2	4 50
40	14 14.6	104.2	13 31.5	104.9	12 48.3	105.6	12 05.0	106.3	11 21.6	107.0	40
30	15 58.7	106.1	15 15.3	106.8	14 31.7	107.5	13 48.1	108.2	13 04.2	108.9	30
20	17 41.9	108.0	16 58.1	108.7	16 14.1	109.4	15 30.0	110.1	14 45.8	110.8	20
10	19 24.0	109.9	18 39.6	110.6	17 55.2	111.3	17 10.6	112.0	16 26.0	112.7	10
4 00	21 04.7	111.9	20 20.0	112.6	19 35.1	113.3	18 50.0	114.0	18 04.8	114.7	4 00
3 50	22 44.2	113.9	21 58.9	114.6	21 13.4	115.3	20 27.8	116.0	19 42.1	116.7	3 50
40	24 22.1	116.0	23 36.3	116.6	22 50.2	117.3	22 04.9	118.0	21 17.6	118.7	40
30	25 58.2	118.1	25 11.8	118.7	24 25.1	119.4	23 18.3	120.1	22 51.3	120.8	30
20	27 32.5	120.2	26 45.4	120.9	25 58.1	121.6	25 10.6	122.3	24 22.9	123.0	20
10	29 04.6	122.5	28 16.8	123.2	27 28.9	123.8	26 40.6	124.5	25 52.3	125.2	10
3 00	30 34.4	124.8	29 45.9	125.5	28 57.2	126.1	28 08.4	126.8	27 19.3	127.4	3 00
2 50	32 01.6	127.2	31 12.4	127.9	30 23.0	128.5	29 33.4	129.2	28 43.5	129.8	2 50
40	33 26.4	129.6	32 36.4	130.3	31 46.1	130.9	30 55.6	131.6	30 05.0	132.2	40
30	34 47.9	132.2	33 57.0	132.8	33 06.0	133.4	32 14.8	134.1	31 23.3	134.7	30
20	36 06.2	134.8	35 14.5	135.4	34 22.7	136.0	33 30.6	136.6	32 38.4	137.2	20
10	37 21.0	137.5	36 28.4	138.1	35 35.8	138.7	34 42.9	139.3	33 49.9	139.8	10
2 00	38 32.0	140.3	37 38.7	140.9	36 45.1	141.4	35 51.4	142.0	34 57.6	142.5	2 00
1 50	39 38.8	143.2	38 44.7	143.7	37 50.3	144.3	36 55.8	144.8	36 01.1	145.3	1 50
40	40 41.3	146.1	39 46.3	146.6	38 51.1	147.2	37 55.8	147.7	37 00.4	148.1	40
30	41 39.0	149.2	40 43.2	149.7	39 47.2	150.2	38 51.2	150.6	37 55.0	151.1	30
20	42 31.7	152.4	41 35.1	152.8	40 38.4	153.2	39 41.6	153.6	38 44.7	154.1	20
10	43 19.0	155.6	42 21.8	156.0	41 24.3	156.4	40 26.8	156.8	39 29.3	157.1	10
1 00	44 00.9	158.9	43 02.9	159.3	42 04.9	159.6	41 06.8	159.9	40 08.6	160.3	1 00
0 50	44 36.7	162.3	43 38.1	162.6	42 39.5	162.9	41 40.8	163.2	40 42.1	163.5	0 50
40	45 06.4	165.8	44 07.3	166.0	43 08.2	166.2	42 09.1	166.5	41 09.9	166.7	40
30	45 29.7	169.3	44 30.2	169.5	43 30.7	169.6	42 31.2	169.8	41 31.8	170.0	30
20	45 46.5	172.8	44 46.7	173.0	43 47.0	173.1	42 47.2	173.2	41 47.4	173.3	20
10	45 56.6	176.4	44 56.7	176.5	43 56.8	176.5	42 56.8	176.6	41 56.9	176.6	10
0 00	46 0.0	180.0	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

23° 38.3

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 50											5 50
40	0 06.6	97.1									40
30	1 53.5	98.8	1 11.4	99.5	0 29.3	100.2					30
20	3 39.8	100.6	2 57.5	101.3	2 15.2	102.0	1 32.9	102.7	0 50.6	103.4	20
10	5 25.6	102.3	4 43.1	103.0	4 00.4	103.7	3 17.9	104.4	2 35.2	105.1	10
5 00	7 10.6	104.1	6 27.8	104.8	5 44.9	105.5	5 01.9	106.2	4 18.9	106.9	5 00
4 50	8 54.8	105.9	8 11.6	106.6	7 28.4	107.3	6 45.0	108.0	6 01.6	108.7	4 50
40	10 38.1	107.7	9 54.5	108.4	9 10.8	109.1	8 27.0	109.8	7 43.2	110.5	40
30	12 20.4	109.6	11 36.2	110.3	10 52.2	111.0	10 08.0	111.6	9 23.7	112.3	30
20	14 01.4	111.5	13 16.9	112.2	12 32.2	112.9	11 47.5	113.5	11 02.7	114.2	20
10	15 41.1	113.4	14 56.0	114.1	14 11.0	114.8	13 25.7	115.4	12 40.4	116.1	10
4 00	17 19.4	115.4	16 33.9	116.0	15 48.2	116.7	15 02.4	117.4	14 16.5	118.0	4 00
3 50	18 56.1	117.4	18 09.9	118.0	17 23.8	118.7	16 37.4	119.4	15 50.9	120.0	3 50
40	20 31.1	119.4	19 44.3	120.1	18 57.5	120.7	18 10.5	121.4	17 23.4	122.0	40
30	22 04.1	121.5	21 16.7	122.2	20 29.2	122.8	19 41.5	123.5	18 53.8	124.1	30
20	23 35.0	123.6	22 47.0	124.3	21 58.8	124.9	21 10.4	125.6	20 21.9	126.2	20
10	25 03.8	125.8	24 14.9	126.5	23 26.1	127.1	22 37.1	127.8	21 47.9	128.4	10
3 00	26 30.0	128.1	25 40.5	128.7	24 50.9	129.3	24 01.1	130.0	23 11.2	130.6	3 00
2 50	27 53.5	130.4	27 03.2	131.0	26 12.9	131.6	25 22.4	132.3	24 31.8	132.8	2 50
40	29 14.2	132.8	28 23.2	133.4	27 32.1	134.0	26 40.8	134.6	25 49.4	135.1	40
30	30 31.8	135.3	29 39.9	135.8	28 48.1	136.4	27 56.1	137.0	27 03.9	137.5	30
20	31 46.0	137.8	30 53.4	138.3	30 00.7	138.9	29 07.9	139.4	28 15.0	140.0	20
10	32 56.8	140.4	32 03.4	140.9	31 09.9	141.5	30 16.3	142.0	29 22.6	142.5	10
2 00	34 03.6	143.1	33 09.5	143.6	32 15.2	144.1	31 20.8	144.6	30 26.4	145.1	2 00
1 50	35 06.3	145.8	34 11.4	146.3	33 16.4	146.7	32 21.3	147.2	31 26.1	147.7	1 50
40	36 04.9	148.6	35 09.2	149.1	34 13.4	149.5	33 17.6	150.0	32 21.7	150.4	40
30	36 58.7	151.5	36 02.2	151.9	35 05.9	152.3	34 09.3	152.8	33 12.7	153.2	30
20	37 47.7	154.5	36 50.7	154.9	35 53.5	155.2	34 56.3	155.6	33 59.0	156.0	20
10	38 31.6	157.5	37 34.0	157.9	36 36.2	158.2	35 38.3	158.5	34 40.6	158.8	10
1 00	39 10.4	160.6	38 12.1	160.9	37 13.8	161.2	36 15.4	161.5	35 17.0	161.8	1 00
0 50	39 43.4	163.7	38 44.6	164.0	37 45.7	164.2	36 46.9	164.5	35 48.0	164.7	0 50
40	40 10.7	166.9	39 11.5	167.1	38 12.3	167.3	37 13.0	167.5	36 13.7	167.7	40
30	40 32.1	170.2	39 32.6	170.3	38 33.1	170.5	37 33.5	170.6	36 33.9	170.8	30
20	40 47.6	173.4	39 47.8	173.5	38 48.0	173.6	37 48.2	173.7	36 48.4	173.8	20
10	40 56.9	176.7	39 56.9	176.7	38 57.0	176.8	37 57.0	176.8	36 57.1	176.9	10
0 00	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 08.2	104.1									5 20
10	1 52.4	105.8	1 09.8	106.6	0 27.1	107.3					10
5 00	3 35.8	107.6	2 52.7	108.3	2 09.6	109.0	1 26.5	109.7	0 43.3	110.4	5 00
4 50	5 18.1	109.4	4 34.6	110.1	3 51.1	110.8	3 07.5	111.5	2 23.9	112.1	4 50
40	6 59.3	111.2	6 15.3	111.9	5 31.3	112.6	4 47.2	113.3	4 03.1	113.9	40
30	8 39.2	113.0	7 54.8	113.7	7 10.3	114.4	6 25.7	115.1	5 41.1	115.7	30
20	10 17.8	114.9	9 32.8	115.6	8 47.8	116.2	8 02.7	116.9	7 17.5	117.6	20
10	11 55.0	116.8	11 09.5	117.4	10 23.9	118.0	9 38.1	118.7	8 52.4	119.4	10
4 00	13 30.5	118.7	12 44.4	119.4	11 58.2	120.0	11 11.9	120.7	10 25.5	121.3	4 00
3 50	15 04.2	120.7	14 17.5	121.4	13 30.7	122.0	12 43.8	122.6	11 56.2	123.2	3 50
40	16 36.1	122.7	15 48.7	123.3	15 01.2	124.0	14 13.6	124.6	13 25.9	125.2	40
30	18 05.8	124.7	17 17.8	125.3	16 29.6	126.0	15 41.4	126.6	14 52.9	127.2	30
20	19 33.3	126.8	18 44.6	127.4	17 55.7	128.1	17 06.8	128.7	16 17.7	129.3	20
10	20 58.5	129.0	20 09.1	129.6	19 19.6	130.2	18 29.8	130.8	17 40.1	131.4	10
3 00	22 21.2	131.2	21 31.0	131.8	20 40.7	132.3	19 50.3	132.9	18 59.8	133.5	3 00
2 50	23 40.9	133.4	22 50.1	134.0	21 59.0	134.5	21 08.2	135.1	20 16.6	135.7	2 50
40	24 57.9	135.7	24 06.2	136.3	23 14.4	136.8	22 22.5	137.4	21 30.5	137.9	40
30	26 11.6	138.1	25 19.2	138.6	24 26.6	139.1	23 33.9	139.7	22 41.2	140.2	30
20	27 21.9	140.5	26 28.8	141.0	25 35.5	141.5	24 42.1	142.0	23 48.6	142.5	20
10	28 28.8	143.0	27 34.8	143.5	26 40.8	144.0	25 46.7	144.4	24 52.4	144.9	10
2 00	29 31.8	145.5	28 37.1	146.0	27 42.4	146.5	26 47.5	146.9	25 52.5	147.4	2 00
1 50	30 30.8	148.1	29 35.5	148.6	28 39.9	149.0	27 44.3	149.4	26 48.7	149.9	1 50
40	31 25.7	150.8	30 29.6	151.2	29 33.4	151.6	28 37.1	152.0	27 40.8	152.4	40
30	32 16.0	153.5	31 19.2	153.9	30 12.4	154.3	29 25.5	154.6	28 28.5	155.0	30
20	33 01.7	156.3	32 04.3	156.7	31 06.9	157.0	30 09.4	157.3	29 11.8	157.7	20
10	33 42.7	159.1	32 44.7	159.5	31 46.7	159.8	30 48.7	160.1	29 50.7	160.4	10
1 00	34 18.5	162.0	33 20.0	162.3	32 21.5	162.6	31 23.0	162.8	30 24.4	163.1	1 00
0 50	34 49.1	164.9	33 50.2	165.2	32 51.2	165.4	31 52.3	165.6	30 53.2	165.8	0 50
40	35 14.4	167.9	34 15.1	168.1	33 15.8	168.3	32 16.5	168.5	31 17.1	168.6	40
30	35 34.3	170.9	34 34.7	171.1	33 35.1	171.2	32 35.5	171.3	31 35.7	171.4	30
20	35 48.6	173.9	34 48.7	174.0	33 48.9	174.1	32 49.1	174.2	31 49.2	174.3	20
10	35 57.1	176.9	34 57.2	177.0	33 57.2	177.0	32 57.3	177.1	31 57.3	177.1	10
0 00	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 00. 2	111. 1									5 00
4 50	1 40. 2	112. 8	0 56. 6	113. 5	0 12. 9	114. 2					4 50
40	3 19. 0	114. 6	2 34. 8	115. 3	1 50. 6	116. 0	1 06. 4	116. 6	0 22. 2	117. 3	40
30	4 56. 4	116. 4	4 11. 7	117. 1	3 26. 9	117. 8	2 42. 1	118. 4	1 57. 4	119. 1	30
20	6 32. 3	118. 2	5 47. 0	118. 9	5 01. 6	119. 5	4 16. 2	120. 2	3 30. 8	120. 9	20
10	8 06. 5	120. 0	7 20. 7	120. 7	6 34. 7	121. 3	5 48. 7	122. 0	5 02. 6	122. 7	10
4 00	9 39. 0	121. 9	8 52. 4	122. 6	8 05. 8	123. 2	7 19. 1	123. 9	6 32. 4	124. 5	4 00
3 50	11 09. 8	123. 8	10 22. 4	124. 5	9 35. 1	125. 1	8 47. 8	125. 7	8 00. 4	126. 4	3 50
40	12 38. 2	125. 8	11 50. 3	126. 4	11 02. 3	127. 1	10 14. 3	127. 7	9 26. 2	128. 3	40
30	14 04. 5	127. 8	13 16. 0	128. 4	12 27. 3	129. 0	11 38. 6	129. 6	10 49. 8	130. 2	30
20	15 28. 6	129. 9	14 39. 3	130. 5	13 50. 0	131. 0	13 00. 5	131. 6	12 11. 0	132. 2	20
10	16 50. 1	131. 9	16 00. 1	132. 5	15 09. 3	133. 1	14 19. 9	133. 6	13 29. 7	134. 2	10
3 00	18 09. 1	134. 0	17 18. 4	134. 6	16 27. 6	135. 2	15 36. 7	135. 7	14 45. 7	136. 3	3 00
2 50	19 25. 2	136. 2	18 33. 8	136. 8	17 42. 1	137. 3	16 50. 7	137. 8	15 58. 8	138. 4	2 50
40	20 38. 3	138. 4	19 46. 1	139. 0	18 53. 8	139. 5	18 01. 4	140. 0	17 08. 9	140. 5	40
30	21 48. 3	140. 7	20 55. 3	141. 2	20 02. 2	141. 7	19 09. 1	142. 2	18 16. 0	142. 7	30
20	22 55. 0	143. 0	22 01. 3	143. 5	21 07. 5	144. 0	20 13. 7	144. 5	19 19. 7	144. 9	20
10	23 58. 1	145. 4	23 03. 7	145. 9	22 09. 1	146. 3	21 14. 7	146. 8	20 20. 1	147. 2	10
2 00	24 57. 4	147. 8	24 02. 3	148. 3	23 07. 1	148. 7	22 11. 9	149. 1	21 16. 6	149. 5	2 00
1 50	25 53. 0	150. 3	24 57. 1	150. 7	24 01. 2	151. 1	23 05. 4	151. 5	22 09. 5	151. 9	1 50
40	26 44. 4	152. 8	25 47. 9	153. 2	24 51. 4	153. 6	23 54. 9	153. 9	22 58. 3	154. 3	40
30	27 31. 6	155. 4	26 34. 5	155. 7	25 37. 2	156. 1	24 40. 3	156. 4	23 43. 1	156. 7	30
20	28 14. 3	158. 0	27 16. 6	158. 3	26 18. 9	158. 6	25 21. 2	158. 9	24 23. 5	159. 2	20
10	28 53. 6	160. 6	27 54. 8	160. 9	26 56. 0	161. 2	25 57. 9	161. 4	24 59. 6	161. 7	10
1 00	29 25. 8	163. 3	28 27. 2	163. 6	27 28. 5	163. 8	26 29. 8	164. 0	25 31. 1	164. 3	1 00
0 50	29 54. 2	166. 0	28 55. 2	166. 2	27 56. 2	166. 4	26 57. 1	166. 6	25 58. 2	166. 8	0 50
40	30 17. 8	168. 8	29 18. 4	169. 0	28 19. 0	169. 1	27 19. 6	169. 3	26 20. 2	169. 5	40
30	30 36. 3	171. 6	29 36. 7	171. 7	28 36. 9	171. 8	27 37. 4	171. 9	26 37. 6	172. 1	30
20	30 49. 4	174. 4	29 49. 5	174. 5	28 49. 7	174. 5	27 49. 9	174. 6	26 50. 0	174. 7	20
10	30 57. 3	177. 2	29 57. 4	177. 2	28 57. 4	177. 3	27 57. 5	177. 3	26 57. 6	177. 3	10
0 00	31 0. 0	180. 0	30 0. 0	180. 0	29 0. 0	180. 0	28 0. 0	180. 0	27 0. 0	180. 0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	1 12.6	119.7	0 27.7	120.4							4 30
20	2 45.3	121.5	1 59.9	122.2	1 14.4	122.8	0 29.0	123.5			20
10	4 16.5	123.3	3 30.4	123.9	2 44.2	124.6	1 58.0	125.2	1 11.8	125.8	10
4 00	5 45.7	125.1	4 58.9	125.7	4 12.1	126.4	3 25.2	127.0	2 38.3	127.6	4 00
3 50	7 13.0	127.0	6 25.5	127.6	5 37.9	128.2	4 50.3	128.8	4 02.7	129.4	3 50
40	8 38.0	128.9	7 49.8	129.5	7 01.6	130.1	6 13.3	130.7	5 25.0	131.3	40
30	10 00.9	130.8	9 12.0	131.4	8 23.0	132.0	7 34.0	132.6	6 44.8	133.1	30
20	11 21.4	132.8	10 31.8	133.3	9 42.1	133.9	8 52.3	134.5	8 02.5	135.0	20
10	12 39.3	134.8	11 49.0	135.3	10 58.5	135.9	10 08.0	136.4	9 17.3	137.0	10
3 00	13 54.6	136.8	13 03.5	137.3	12 12.3	137.9	11 21.0	138.4	10 29.7	138.9	3 00
2 50	15 07.1	138.9	14 15.1	139.4	13 23.1	139 9	12 31.2	140.4	11 39.0	140.9	2 50
40	16 16.4	141.0	15 23.8	141.5	14 31.1	142.0	13 38.4	142.5	12 45.6	143.0	40
30	17 22.7	143.2	16 29.3	143.7	15 36.0	144.1	14 42.6	144.6	13 48.9	145.1	30
20	18 25.7	145.4	17 31.7	145.9	16 37.6	146.3	15 43.4	146.7	14 49.2	147.2	20
10	19 25.3	147.6	18 30.5	148.1	17 35.7	148.5	16 40.8	148.9	15 45.8	149.3	10
2 00	20 21.2	149.9	19 25.8	150.3	18 30.3	150.7	17 34.8	151.1	16 39.2	151.5	2 00
1 50	21 13.4	152.3	20 17.2	152.6	19 21.2	153.0	18 25.0	153.4	17 28.7	153.7	1 50
40	22 01.6	154.6	21 04.9	155.0	20 08.2	155.3	19 11.4	155.7	18 14.6	156.0	40
30	22 45.8	157.0	21 48.5	157.4	20 51.1	157.7	19 53.7	158.0	18 56.4	158.3	30
20	23 25.7	159.5	22 27.9	159.8	21 30.1	160.1	20 32.2	160.4	19 34.3	160.7	20
10	24 01.4	162.0	23 03.0	162.2	22 04.7	162.5	21 06.4	162.7	20 08.0	163.0	10
1 00	24 32.4	164.5	23 33.7	164.7	22 34.9	164.9	21 36.2	165.1	20 37.4	165.4	1 00
0 50	24 59.0	167.0	23 59.8	167.2	23 00.7	167.4	22 01.6	167.6	21 02.4	167.8	0 50
40	25 20.8	169.6	24 21.4	169.8	23 22.0	169.9	22 22.5	170.1	21 23.1	170.2	40
30	25 37.9	172.2	24 38.2	172.3	23 38.6	172.4	22 38.8	172.5	21 39.2	172.6	30
20	25 50.2	174.8	24 50.4	174.8	23 50.5	174.9	22 50.7	175.0	21 50.8	175.1	20
10	25 57.6	177.4	24 57.6	177.4	23 57.6	177.5	22 57.6	177.5	21 57.7	177.5	10
0 00	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 21.3	86.1	1 03.8	85.4	6 10
6 00	0 00.0	90.0	0 42.5	89.3	1 24.9	88.6	2 07.3	87.9	2 49.7	87.2	6 00
5 50	1 46.0	91.7	2 28.4	91.0	3 10.9	90.3	3 53.2	89.6	4 35.6	88.9	5 50
40	3 32.0	93.5	4 14.5	92.8	4 56.9	92.1	5 39.4	91.4	6 21.7	90.7	40
30	5 17.7	95.3	6 00.3	94.6	6 42.8	93.9	7 25.2	93.2	8 07.7	92.5	30
20	7 03.1	97.1	7 45.9	96.4	8 28.5	95.7	9 11.1	95.0	9 53.6	94.3	20
10	8 48.2	98.9	9 31.1	98.2	10 13.9	97.5	10 56.6	96.8	11 39.2	96.1	10
5 00	10 32.7	100.7	11 15.8	100.0	11 58.9	99.3	12 41.8	98.6	13 24.5	97.9	5 00
4 50	12 16.6	102.6	12 59.9	101.8	13 43.1	101.1	14 26.3	100.4	15 09.2	99.7	4 50
40	13 59.7	104.4	14 43.4	103.7	15 27.0	103.0	16 10.4	102.3	16 53.6	101.6	40
30	15 42.0	106.3	16 26.0	105.6	17 09.8	104.9	17 53.5	104.2	18 37.0	103.5	30
20	17 23.3	108.2	18 07.7	107.5	18 51.9	106.8	19 36.0	106.1	20 19.8	105.4	20
10	19 03.4	110.2	19 48.2	109.5	20 32.8	108.8	21 17.3	108.1	22 01.5	107.4	10
4 00	20 42.3	112.2	21 27.5	111.5	22 12.6	110.8	22 57.5	110.1	23 42.3	109.4	4 00
3 50	22 19.8	114.2	23 05.6	113.5	23 51.1	112.8	24 36.4	112.1	25 21.7	111.4	3 50
40	23 55.6	116.3	24 41.9	115.6	25 28.1	114.9	26 14.0	114.2	26 59.7	113.5	40
30	25 29.8	118.5	26 16.8	117.8	27 03.4	117.1	27 49.9	116.4	28 36.1	115.7	30
20	27 02.0	120.7	27 49.6	120.0	28 36.9	119.3	29 24.0	118.6	30 10.9	117.9	20
10	28 32.2	123.0	29 20.3	122.3	30 08.3	121.6	30 56.2	120.9	31 43.6	120.2	10
3 00	30 00.0	125.3	30 48.9	124.6	31 37.5	123.9	32 26.0	123.2	33 14.2	122.5	3 00
2 50	31 25.2	127.7	32 14.9	127.0	33 04.2	126.3	33 53.5	125.6	34 42.4	124.9	2 50
40	32 47.9	130.1	33 38.3	129.5	34 28.4	128.8	35 18.4	128.1	36 08.1	127.4	40
30	34 07.4	132.7	34 58.6	132.1	35 49.5	131.4	36 40.2	130.7	37 30.8	130.0	30
20	35 23.8	135.3	36 15.8	134.7	37 07.5	134.0	37 59.1	133.4	38 50.4	132.7	20
10	36 36.5	138.0	37 29.4	137.4	38 21.9	136.8	39 14.3	136.2	40 06.4	135.5	10
2 00	37 45.6	140.8	38 39.2	140.2	39 32.6	139.6	40 25.9	139.0	41 18.9	138.4	2 00
1 50	38 50.6	143.6	39 45.1	143.1	40 39.4	142.5	41 33.4	142.0	42 27.2	141.4	1 50
40	39 51.4	146.6	40 46.4	146.1	41 41.6	145.6	42 36.5	145.0	43 31.2	144.5	40
30	40 47.2	149.6	41 43.3	149.2	42 39.2	148.7	43 34.9	148.1	44 30.4	147.6	30
20	41 38.5	152.8	42 35.2	152.4	43 31.8	151.9	44 28.3	151.4	45 24.7	150.9	20
10	42 24.2	156.0	43 21.8	155.6	44 19.1	155.2	45 16.3	154.7	46 13.5	154.3	10
1 00	43 04.8	159.2	44 02.8	158.9	45 00.8	158.5	45 58.7	158.2	46 56.5	157.8	1 00
0 50	43 39.4	162.6	44 38.1	162.3	45 36.8	162.0	46 35.1	161.7	47 33.5	161.3	0 50
40	44 08.1	166.0	45 07.2	165.8	46 06.3	165.5	47 05.4	165.2	48 04.3	165.0	40
30	44 30.7	169.4	45 30.1	169.3	46 29.8	169.1	47 29.1	168.9	48 28.5	168.7	30
20	44 47.0	172.9	45 46.8	172.8	46 46.5	172.7	47 46.3	172.6	48 46.0	172.4	20
10	44 56.7	176.4	45 56.6	176.4	46 56.6	176.3	47 56.5	176.3	48 56.4	176.2	10
0 00	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 24. 1	79. 1	1 06. 9	78. 4	6 30
20	0 00. 8	82. 9	0 43. 4	82. 2	1 26. 0	81. 5	2 08. 6	80. 8	2 51. 1	80. 1	20
10	1 46. 2	84. 7	2 28. 7	84. 0	3 11. 2	83. 3	3 53. 5	82. 5	4 35. 9	81. 9	10
6 00	3 32. 0	86. 5	4 14. 3	85. 8	4 56. 6	85. 0	5 38. 9	84. 3	6 21. 1	83. 6	6 00
5 50	5 17. 9	88. 2	6 00. 2	87. 5	6 42. 4	86. 8	7 24. 5	86. 0	8 06. 6	85. 3	5 50
40	7 04. 0	90. 0	7 46. 2	89. 3	8 28. 4	88. 5	9 10. 4	87. 8	9 52. 5	87. 1	40
30	8 50. 1	91. 8	9 32. 2	91. 0	10 14. 4	90. 3	10 56. 5	89. 6	11 38. 4	88. 9	30
20	10 36. 0	93. 5	11 18. 3	92. 8	12 00. 5	92. 1	12 42. 6	91. 4	13 24. 5	90. 6	20
10	12 21. 7	95. 3	13 04. 1	94. 6	13 46. 5	93. 9	14 28. 6	93. 2	15 10. 6	92. 4	10
5 00	14 07. 2	97. 1	14 49. 7	96. 4	15 32. 1	95. 7	16 14. 4	95. 0	16 56. 5	94. 2	5 00
4 50	15 52. 2	98. 9	16 34. 8	98. 2	17 17. 5	97. 5	17 59. 9	96. 8	18 42. 0	96. 0	4 50
40	17 36. 7	100. 8	18 19. 6	100. 1	19 02. 4	99. 4	19 45. 0	98. 6	20 27. 4	97. 9	40
30	19 20. 4	102. 7	20 03. 7	102. 0	20 46. 7	101. 3	21 29. 5	100. 5	22 12. 2	99. 7	30
20	21 03. 6	104. 7	21 47. 1	103. 9	22 30. 4	103. 2	23 13. 5	102. 4	23 56. 4	101. 7	20
10	22 45. 7	106. 6	23 29. 5	105. 9	24 13. 3	105. 2	24 56. 7	104. 4	25 39. 8	103. 6	10
4 00	24 26. 8	108. 6	25 11. 1	107. 9	25 55. 1	107. 1	26 39. 0	106. 4	27 22. 6	105. 6	4 00
3 50	26 06. 6	110. 7	26 51. 3	109. 9	27 35. 9	109. 2	28 20. 2	108. 4	29 04. 2	107. 6	3 50
40	27 45. 2	112. 8	28 30. 4	112. 0	29 15. 5	111. 3	30 00. 2	110. 5	30 44. 7	109. 7	40
30	29 22. 2	114. 9	30 08. 0	114. 2	30 53. 6	113. 5	31 38. 8	112. 7	32 23. 8	111. 9	30
20	30 57. 5	117. 1	31 43. 9	116. 4	32 30. 0	115. 7	33 15. 8	114. 9	34 01. 4	114. 1	20
10	32 30. 9	119. 4	33 17. 9	118. 7	34 04. 7	118. 0	34 51. 2	117. 2	35 37. 3	116. 4	10
3 00	34 02. 2	121. 8	34 49. 9	121. 1	35 37. 4	120. 3	36 24. 6	119. 5	37 11. 4	118. 8	3 00
2 50	35 31. 2	124. 2	36 19. 8	123. 5	37 07. 8	122. 8	37 55. 7	122. 0	38 43. 3	121. 2	2 50
40	36 57. 6	126. 7	37 46. 8	126. 0	38 35. 7	125. 3	39 24. 4	124. 5	40 12. 8	123. 7	40
30	38 21. 1	129. 3	39 11. 1	128. 6	40 00. 8	127. 9	40 50. 3	127. 2	41 39. 5	126. 4	30
20	39 41. 5	132. 0	40 32. 4	131. 4	41 23. 0	130. 7	42 13. 3	129. 9	43 03. 4	129. 2	20
10	40 58. 5	134. 9	41 50. 2	134. 2	42 41. 7	133. 5	43 33. 0	132. 8	44 23. 9	132. 0	10
2 00	42 11. 8	137. 8	43 04. 4	137. 1	43 56. 8	136. 4	44 48. 9	135. 7	45 40. 8	135. 0	2 00
1 50	43 21. 0	140. 8	44 14. 5	140. 1	45 07. 8	139. 5	46 00. 9	138. 8	46 53. 8	138. 1	1 50
40	44 25. 8	143. 9	45 20. 3	143. 3	46 14. 5	142. 7	47 08. 5	142. 0	48 02. 2	141. 4	40
30	45 25. 9	147. 1	46 21. 3	146. 5	47 16. 4	146. 0	48 11. 3	145. 4	49 06. 0	144. 8	30
20	46 20. 9	150. 4	47 17. 1	149. 9	48 13. 1	149. 4	49 08. 9	148. 8	50 04. 6	148. 2	20
10	47 10. 5	153. 9	48 07. 5	153. 4	49 04. 2	152. 9	50 01. 0	152. 4	50 57. 6	151. 9	10
1 00	47 54. 3	157. 4	48 52. 0	157. 0	49 49. 6	156. 5	50 47. 1	156. 1	51 44. 5	155. 6	1 00
0 50	48 32. 0	161. 0	49 30. 4	160. 6	50 28. 7	160. 3	51 26. 9	159. 9	52 25. 0	159. 5	0 50
40	49 03. 3	164. 7	50 02. 3	164. 4	51 01. 2	164. 1	52 00. 0	163. 8	52 58. 8	163. 5	40
30	49 28. 0	168. 5	50 27. 2	168. 2	51 26. 8	168. 0	52 26. 0	167. 8	53 25. 2	167. 6	30
20	49 45. 7	172. 3	50 45. 4	172. 1	51 45. 2	172. 0	52 44. 8	171. 8	53 44. 5	171. 6	20
10	49 56. 4	176. 1	50 56. 2	176. 0	51 56. 2	176. 0	52 56. 2	175. 9	53 56. 2	175. 8	10
0 00	50 0. 0	180. 0	51 0. 0	180. 0	52 0. 0	180. 0	53 0. 0	180. 0	54 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 34.1	72.1	1 17.6	71.4	6 50
40	0 06.5	75.9	0 49.5	75.2	1 32.6	74.5	2 15.6	73.8	2 58.6	73.1	40
30	1 49.7	77.7	2 32.4	77.0	3 15.2	76.2	3 57.8	75.5	4 40.5	74.8	30
20	3 33.6	79.4	4 16.1	78.7	4 58.6	78.0	5 41.0	77.3	6 23.4	76.6	20
10	5 18.1	81.1	6 00.4	80.4	6 42.6	79.7	7 24.7	79.0	8 06.8	78.3	10
6 00	7 03.2	82.9	7 45.3	82.2	8 27.3	81.5	9 09.2	80.7	9 51.0	80.0	6 00
5 50	8 48.7	84.6	9 30.5	83.9	10 12.4	83.2	10 54.0	82.4	11 35.7	81.7	5 50
40	10 34.4	86.4	11 16.2	85.6	11 57.9	84.9	12 39.4	84.2	13 20.9	83.4	40
30	12 20.3	88.1	13 02.0	87.4	13 43.6	86.6	14 24.9	85.9	15 06.3	85.1	30
20	14 06.3	89.9	14 48.1	89.2	15 29.6	88.4	16 11.0	87.7	16 52.2	86.9	20
10	15 52.4	91.7	16 34.1	90.9	17 15.6	90.2	17 57.1	89.4	18 38.2	88.6	10
5 00	17 38.4	93.5	18 20.1	92.7	19 01.7	92.0	19 43.1	91.2	20 24.3	90.4	5 00
4 50	19 24.2	95.3	20 05.9	94.5	20 47.6	93.8	21 29.0	93.0	22 10.4	92.2	4 50
40	21 09.6	97.1	21 51.6	96.3	22 33.3	95.6	23 14.8	94.8	23 56.2	94.0	40
30	22 54.6	99.0	23 36.7	98.2	24 18.8	97.4	25 00.4	96.6	25 41.8	95.8	30
20	24 39.0	100.9	25 21.5	100.1	26 03.7	99.3	26 45.6	98.5	27 27.2	97.7	20
10	26 22.8	102.8	27 05.5	102.0	27 48.1	101.2	28 30.1	100.4	29 12.0	99.6	10
4 00	28 05.9	104.8	28 48.9	104.0	29 31.7	103.2	30 14.1	102.4	30 56.3	101.6	4 00
3 50	29 47.8	106.8	30 31.3	106.0	31 14.5	105.2	31 57.2	104.4	32 39.8	103.6	3 50
40	31 28.8	108.9	32 12.7	108.1	32 56.3	107.3	33 39.5	106.5	34 22.5	105.6	40
30	33 08.5	111.1	33 52.9	110.3	34 37.0	109.5	35 20.6	108.6	36 04.0	107.8	30
20	34 46.7	113.3	35 31.6	112.5	36 16.2	111.7	37 00.4	110.8	37 44.4	110.0	20
10	36 23.3	115.6	37 08.8	114.8	37 54.1	114.0	38 38.8	113.1	39 23.3	112.3	10
3 00	37 58.0	118.0	38 44.2	117.1	39 30.1	116.3	40 15.6	115.5	41 00.7	114.6	3 00
2 50	39 30.6	120.4	40 17.5	119.6	41 04.1	118.8	41 50.2	117.9	42 36.5	117.1	2 50
40	41 00.9	123.0	41 48.6	122.2	42 36.0	121.3	43 22.9	120.5	44 09.5	119.6	40
30	42 28.5	125.6	43 17.0	124.8	44 05.3	124.0	44 53.0	123.2	45 40.5	122.3	30
20	43 53.1	128.4	44 42.6	127.6	45 31.7	126.8	46 20.4	126.0	47 08.8	125.1	20
10	45 14.6	131.3	46 05.0	130.5	46 55.0	129.7	47 44.7	128.9	48 34.0	128.1	10
2 00	46 32.4	134.3	47 23.7	133.5	48 14.8	132.7	49 05.4	131.9	49 55.8	131.1	2 00
1 50	47 46.3	137.4	48 38.7	136.7	49 30.7	135.9	50 22.2	135.1	51 13.6	134.3	1 50
40	48 55.8	140.7	49 49.2	140.0	50 42.2	139.3	51 34.9	138.5	52 27.4	137.7	40
30	50 00.7	144.1	50 54.9	143.4	51 48.9	142.7	52 42.9	142.0	53 36.9	141.3	30
20	51 00.1	147.6	51 55.4	147.0	52 50.5	146.4	53 45.3	145.7	54 40.0	145.0	20
10	51 53.9	151.3	52 50.2	150.7	53 46.2	150.1	54 42.1	149.5	55 37.8	148.9	10
1 00	52 41.8	155.1	53 38.9	154.6	54 35.9	154.1	55 32.7	153.5	56 29.4	152.9	1 00
0 50	53 23.1	159.0	54 20.9	158.6	55 18.9	158.2	56 16.5	157.7	57 14.1	157.2	0 50
40	53 57.5	163.1	54 56.1	162.7	55 54.7	162.4	56 53.1	162.0	57 51.6	161.5	40
30	54 24.6	167.3	55 23.7	167.0	56 23.0	166.7	57 22.0	166.4	58 21.2	166.0	30
20	54 44.2	171.5	55 43.8	171.3	56 43.4	171.1	57 43.1	170.9	58 42.6	170.6	20
10	54 56.1	175.7	55 56.0	175.6	56 55.9	175.5	57 55.7	175.4	58 55.5	175.3	10
0 00	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20									0 05.3	62.7	7 20
10					0 11.6	65.8	0 55.9	65.2	1 40.2	64.5	10
7 00	0 21.5	68.9	1 05.3	68.2	1 49.1	67.6	2 32.9	66.9	3 16.7	66.2	7 00
6 50	2 01.0	70.7	2 44.3	70.0	3 27.7	69.3	4 10.9	68.6	4 54.3	67.9	6 50
40	3 41.7	72.4	4 24.6	71.7	5 07.5	71.0	5 50.4	70.3	6 33.2	69.6	40
30	5 23.1	74.1	6 05.7	73.4	6 48.1	72.7	7 30.7	72.0	8 13.1	71.3	30
20	7 05.6	75.9	7 47.9	75.2	8 30.0	74.4	9 12.0	73.7	9 54.0	73.0	20
10	8 48.9	77.6	9 30.8	76.9	10 12.5	76.1	10 54.2	75.4	11 36.0	74.7	10
6 00	10 32.7	79.3	11 14.4	78.6	11 55.9	77.8	12 37.3	77.1	13 18.6	76.3	6 00
5 50	12 17.1	81.0	12 58.6	80.2	13 39.8	79.5	14 20.9	78.7	15 02.0	78.0	5 50
40	14 02.2	82.7	14 43.3	81.9	15 24.4	81.2	16 05.3	80.4	16 46.1	79.7	40
30	15 47.6	84.1	16 28.6	83.6	17 09.3	82.9	17 50.1	82.1	18 30.7	81.3	30
20	17 33.3	86.1	18 14.2	85.4	18 54.9	84.6	19 35.4	83.8	20 15.7	83.0	20
10	19 19.1	87.8	20 00.0	87.1	20 40.6	86.3	21 20.9	85.5	22 01.2	84.7	10
5 00	21 05.2	89.6	21 46.0	88.8	22 26.5	88.0	23 06.8	87.2	23 46.9	86.4	5 00
4 50	22 51.3	91.4	23 32.1	90.6	24 12.5	89.8	24 52.8	88.9	25 32.8	88.1	4 50
40	24 37.3	93.2	25 18.0	92.4	25 58.6	91.6	26 38.9	90.7	27 18.9	89.9	40
30	26 23.0	95.0	27 03.9	94.2	27 44.5	93.4	28 24.9	92.5	29 05.0	91.7	30
20	28 08.6	96.9	28 49.6	96.1	29 30.4	95.2	30 10.8	94.4	30 50.9	93.5	20
10	29 53.7	98.8	30 34.9	98.0	31 15.8	97.1	31 56.4	96.2	32 36.6	95.4	10
4 00	31 38.2	100.7	32 19.7	99.9	33 00.8	99.0	33 41.6	98.1	34 22.0	97.3	4 00
3 50	33 21.9	102.7	34 03.8	101.9	34 45.1	101.0	35 26.2	100.1	36 07.0	99.2	3 50
40	35 05.0	104.8	35 47.2	103.9	36 29.0	103.0	37 10.4	102.1	37 51.4	101.2	40
30	36 47.0	106.9	37 29.8	106.0	38 11.9	105.1	38 53.7	104.2	39 35.1	103.3	30
20	38 27.9	109.1	39 11.0	108.2	39 53.8	107.3	40 36.0	106.4	41 17.9	105.4	20
10	40 07.4	111.4	40 51.1	110.5	41 34.4	109.5	42 17.1	108.6	42 59.5	107.6	10
3 00	41 45.5	113.7	42 29.8	112.8	43 13.6	111.9	43 57.1	110.9	44 40.0	109.9	3 00
2 50	43 21.5	116.2	44 06.7	115.3	44 51.0	114.3	45 35.2	113.3	46 19.0	112.3	2 50
40	44 55.8	118.7	45 41.5	117.8	46 26.8	116.9	47 11.7	115.9	47 56.0	114.9	40
30	46 27.4	121.4	47 14.1	120.4	48 00.2	119.5	48 45.9	118.6	49 31.2	117.6	30
20	47 56.7	124.2	48 44.2	123.3	49 31.3	122.3	50 17.9	121.3	51 04.0	120.3	20
10	49 22.9	127.1	50 11.4	126.3	50 59.4	125.3	51 47.0	124.3	52 34.7	123.3	10
2 00	50 45.8	130.2	51 35.3	129.3	52 24.3	128.4	53 13.0	127.4	54 01.2	126.4	2 00
1 50	52 04.7	133.5	52 55.3	132.6	53 45.5	131.7	54 35.4	130.7	55 24.7	129.7	1 50
40	53 19.5	136.9	54 11.2	136.0	55 02.6	135.1	55 53.6	134.2	56 44.2	133.2	40
30	54 29.4	140.5	55 22.5	139.7	56 15.1	138.8	57 07.1	137.9	57 59.0	137.0	30
20	55 34.4	144.2	56 28.4	143.5	57 22.2	142.7	58 15.7	141.8	59 08.8	140.9	20
10	56 33.2	148.2	57 28.5	147.5	58 23.4	146.7	59 18.2	145.9	60 12.7	145.0	10
1 00	57 25.9	152.3	58 22.2	151.7	59 18.3	151.0	60 14.2	150.3	61 09.9	149.5	1 00
0 50	58 11.5	156.6	59 08.9	156.1	60 06.0	155.5	61 03.1	154.9	62 00.0	154.2	0 50
40	58 49.9	161.1	59 48.1	160.6	60 46.3	160.1	61 44.3	159.6	62 42.2	159.0	40
30	59 20.2	165.7	60 19.1	165.3	61 18.1	165.0	62 16.9	164.6	63 15.7	164.1	30
20	59 42.2	170.4	60 41.7	170.1	61 41.2	169.9	62 40.8	169.6	63 40.2	169.3	20
10	59 55.4	175.2	60 55.5	175.1	61 55.2	175.0	62 55.1	174.8	63 55.0	174.6	10
0 00	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40							0 04.2	56.6	0 50.2	55.9	7 40
30			0 02.7	59.6	0 48.1	59.0	1 33.4	58.3	2 19.0	57.7	30
20	0 50.1	62.0	1 34.9	61.3	2 19.7	60.7	3 04.5	60.0	3 49.2	59.4	20
10	2 24.5	63.8	3 08.7	63.1	3 53.0	62.4	4 37.2	61.7	5 21.3	61.0	10
7 00	4 00.4	65.5	4 44.1	64.8	5 27.8	64.1	6 11.5	63.4	6 55.0	62.7	7 00
6 50	5 37.4	67.2	6 20.7	66.5	7 03.7	65.8	7 47.0	65.1	8 30.0	64.4	6 50
40	7 15.9	68.9	7 58.6	68.2	8 41.2	67.5	9 23.8	66.8	10 06.2	66.1	40
30	8 55.4	70.6	9 37.6	69.9	10 19.7	69.1	11 01.7	68.4	11 43.9	67.7	30
20	10 35.9	72.3	11 17.7	71.5	11 59.4	70.8	12 41.0	70.0	13 22.5	69.3	20
10	12 17.3	74.0	12 58.8	73.2	13 40.0	72.5	14 21.1	71.7	15 02.1	71.0	10
6 00	13 59.7	75.6	14 40.7	74.8	15 21.6	74.1	16 02.3	73.3	16 42.8	72.6	6 00
5 50	15 42.7	77.2	16 23.4	76.5	17 04.0	75.7	17 44.2	74.9	18 24.5	74.2	5 50
40	17 26.6	78.9	18 07.0	78.1	18 47.2	77.3	19 27.1	76.5	20 06.9	75.7	40
30	19 10.8	80.5	19 51.0	79.7	20 30.8	78.9	21 10.6	78.2	21 50.1	77.3	30
20	20 55.8	82.2	21 35.7	81.4	22 15.3	80.6	22 54.7	79.8	23 33.8	79.0	20
10	22 41.1	83.9	23 20.7	83.1	24 00.2	82.2	24 39.3	81.4	25 18.2	80.6	10
5 00	24 26.7	85.6	25 06.2	84.8	25 45.5	83.9	26 24.5	83.1	27 03.1	82.3	5 00
4 50	26 12.5	87.3	26 52.0	86.5	27 31.1	85.6	28 09.9	84.8	28 48.4	83.9	4 50
40	27 58.6	89.1	28 37.9	88.2	29 17.0	87.3	29 55.7	86.4	30 34.0	85.5	40
30	29 44.5	90.8	30 23.9	89.9	31 03.0	89.0	31 41.5	88.1	32 20.0	87.2	30
20	31 30.7	92.6	32 10.0	91.7	32 49.0	90.8	33 27.7	89.9	34 05.9	89.0	20
10	33 16.4	94.4	33 56.0	93.5	34 35.0	92.6	35 13.7	91.7	35 52.0	90.8	10
4 00	35 02.1	96.3	35 41.6	95.4	36 20.9	94.5	36 59.6	93.5	37 37.9	92.6	4 00
3 50	36 47.2	98.3	37 27.2	97.3	38 06.4	96.4	38 45.4	95.4	39 23.7	94.4	3 50
40	38 32.0	100.3	39 12.1	99.3	39 51.7	98.3	40 30.8	97.3	41 09.4	96.3	40
30	40 16.0	102.3	40 56.4	101.4	41 36.2	100.4	42 15.7	99.3	42 54.6	98.3	30
20	41 59.2	104.4	42 40.0	103.5	43 20.3	102.5	44 00.1	101.4	44 39.3	100.4	20
10	43 41.3	106.6	44 22.6	105.7	45 03.5	104.7	45 43.6	103.6	46 23.2	102.5	10
3 00	45 22.4	108.9	46 04.2	107.9	46 45.6	106.9	47 26.3	105.8	48 06.4	104.7	3 00
2 50	47 01.8	111.3	47 44.4	110.3	48 26.4	109.2	49 07.7	108.1	49 48.4	107.0	2 50
40	48 39.8	113.8	49 23.1	112.8	50 05.7	111.7	50 47.8	110.6	51 29.1	109.5	40
30	50 15.7	116.5	50 59.9	115.5	51 43.4	114.4	52 26.2	113.3	53 08.4	112.1	30
20	51 49.6	119.3	52 34.5	118.2	53 18.9	117.1	54 02.7	116.0	54 45.7	114.8	20
10	53 20.7	122.3	54 06.7	121.2	54 52.0	120.1	55 36.7	118.9	56 20.9	117.7	10
2 00	54 48.9	125.4	55 35.9	124.3	56 22.5	123.2	57 08.4	122.0	57 53.5	120.8	2 00
1 50	56 13.5	128.7	57 01.9	127.6	57 49.5	126.5	58 36.6	125.3	59 23.0	124.1	1 50
40	57 34.3	132.2	58 23.8	131.2	59 12.8	130.0	60 01.3	128.9	60 49.0	127.7	40
30	58 50.4	136.0	59 41.2	134.9	60 31.5	133.8	61 21.4	132.7	62 10.7	131.5	30
20	60 01.5	140.0	60 53.7	139.0	61 45.5	137.9	62 36.9	136.8	63 27.6	135.6	20
10	61 06.5	144.2	62 00.2	143.3	62 53.6	142.3	63 46.5	141.2	64 38.7	140.1	10
1 00	62 05.3	148.7	63 00.4	147.8	63 55.1	146.9	64 49.5	145.9	65 43.4	144.9	1 00
0 50	62 56.5	153.4	63 52.9	152.7	64 49.0	151.9	65 45.0	151.0	66 40.4	150.0	0 50
40	63 40.0	158.4	64 37.5	157.8	65 34.9	157.1	66 32.0	156.3	67 28.8	155.5	40
30	64 14.4	163.6	65 13.0	163.1	66 11.5	162.6	67 09.9	162.0	68 08.0	161.3	30
20	64 39.6	169.0	65 38.9	168.7	66 38.2	168.3	67 37.4	167.9	68 36.6	167.4	20
10	64 54.9	174.5	65 54.7	174.3	66 54.5	174.1	67 54.2	173.9	68 54.0	173.7	10
0 00	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 46.0	91.7	1 03.5	92.5	0 21.1	93.2					5 50
40	3 32.0	93.5	2 49.5	94.3	2 06.9	95.0	1 24.4	95.7	0 41.8	96.4	40
30	5 17.7	95.3	4 35.1	96.0	3 52.4	96.7	3 09.8	97.4	2 27.0	98.1	30
20	7 03.1	97.1	6 20.4	97.8	5 37.6	98.5	4 54.6	99.2	4 11.7	99.9	20
10	8 48.2	98.9	8 05.2	99.6	7 22.1	100.3	6 39.1	101.0	5 55.9	101.7	10
5 00	10 32.7	100.7	9 49.5	101.4	9 06.3	102.1	8 22.9	102.8	7 39.4	103.5	5 00
4 50	12 16.6	102.6	11 33.1	103.3	10 49.5	103.9	9 05.9	104.6	8 22.1	105.3	4 50
40	13 59.7	104.4	13 16.0	105.1	12 32.1	105.8	11 48.0	106.5	11 03.9	107.2	40
30	15 42.0	106.3	14 57.9	107.0	14 13.5	107.7	13 29.2	108.4	12 44.7	109.1	30
20	17 23.6	108.2	16 38.8	109.0	15 54.1	109.7	15 09.3	110.3	14 24.4	111.0	20
10	19 03.4	110.2	18 18.4	110.9	17 33.2	111.6	16 48.1	112.3	16 02.7	113.0	10
4 00	20 42.3	112.2	19 56.8	112.9	19 11.2	113.6	18 25.4	114.3	17 39.6	115.0	4 00
3 50	22 19.8	114.2	21 33.8	114.9	20 47.7	115.6	20 01.4	116.3	19 14.9	117.0	3 50
40	23 55.6	116.3	23 09.2	117.0	22 22.5	117.7	21 35.6	118.4	20 48.6	119.1	40
30	25 29.8	118.5	24 42.8	119.2	23 55.4	119.8	23 08.0	120.5	22 20.3	121.2	30
20	27 02.0	120.7	26 14.3	121.4	25 26.4	122.0	24 38.3	122.7	23 50.1	123.3	20
10	28 32.2	123.0	27 43.8	123.6	26 55.2	124.3	26 06.6	124.9	25 17.5	125.6	10
3 00	30 00.0	125.3	29 10.9	125.9	28 21.6	126.6	27 32.2	127.2	26 42.6	127.9	3 00
2 50	31 25.2	127.7	30 35.5	128.3	29 45.4	129.0	28 55.3	129.6	28 04.9	130.2	2 50
40	32 47.9	130.1	31 57.3	130.8	31 06.6	131.4	30 15.6	132.0	29 24.5	132.6	40
30	34 07.4	132.7	33 16.1	133.3	32 24.6	133.9	31 32.9	134.5	30 41.0	135.1	30
20	35 23.8	135.3	34 31.6	135.9	33 39.4	136.5	32 46.9	137.1	31 54.2	137.6	20
10	36 36.5	138.0	35 43.7	138.6	34 50.5	139.2	33 57.4	139.7	33 03.8	140.2	10
2 00	37 45.6	140.8	36 52.0	141.3	35 58.0	141.9	35 03.9	142.4	34 09.8	142.9	2 00
1 50	38 50.6	143.6	37 56.2	144.1	37 01.5	144.7	36 06.7	145.2	35 11.7	145.7	1 50
40	39 51.4	146.6	38 56.0	147.1	38 00.6	147.6	37 05.0	148.1	36 09.3	148.5	40
30	40 47.2	149.6	39 51.2	150.1	38 55.1	150.6	37 58.8	151.0	37 52.3	151.4	30
20	41 38.5	152.8	40 41.6	153.2	39 44.7	153.6	38 47.7	154.0	37 50.7	154.4	20
10	42 24.2	156.0	41 26.9	156.4	40 29.2	156.7	39 31.7	157.1	38 34.0	157.4	10
1 00	43 04.8	159.2	42 06.7	159.6	41 08.5	159.9	40 10.3	160.2	39 12.0	160.5	1 00
0 50	43 39.4	162.6	42 40.8	162.9	41 42.1	163.2	40 43.4	163.4	39 44.6	163.7	0 50
40	44 08.1	166.0	43 09.0	166.2	42 09.9	166.5	41 10.7	166.7	40 11.5	166.9	40
30	44 30.7	169.4	43 31.2	169.6	42 31.8	169.8	41 32.2	170.0	40 32.6	170.1	30
20	44 47.0	172.9	43 47.2	173.1	42 47.4	173.2	41 47.6	173.3	40 47.8	173.4	20
10	44 56.7	176.4	43 56.8	176.5	42 56.8	176.6	41 56.9	176.6	40 56.9	176.7	10
0 00	45 0.0	180.0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 44.2	98.8	1 01.4	99.5	0 18.6	100.2					5 30
20	3 28.7	100.6	2 45.7	101.3	2 02.7	102.0	1 19.7	102.7	0 36.7	103.4	20
10	5 12.7	102.4	4 29.4	103.1	3 46.2	103.8	3 02.9	104.5	2 19.4	105.2	10
5 00	6 55.9	104.2	6 12.4	104.9	5 28.8	105.6	4 45.1	106.3	4 01.4	107.0	5 00
4 50	7 38.2	106.0	6 54.3	106.7	7 10.4	107.4	6 26.4	108.1	5 42.2	108.8	4 50
40	10 19.7	107.9	9 35.4	108.6	8 51.1	109.3	8 06.6	110.0	7 22.1	110.6	40
30	12 00.0	109.8	11 15.4	110.5	10 30.6	111.2	9 45.7	111.8	9 00.7	112.5	30
20	13 39.3	111.7	12 54.2	112.4	12 08.9	113.1	11 23.5	113.7	10 38.0	114.4	20
10	15 17.1	113.6	14 31.5	114.3	13 45.8	115.0	12 59.9	115.6	12 13.9	116.3	10
4 00	16 53.6	115.6	16 07.4	116.3	15 21.1	117.0	14 34.7	117.6	13 48.2	118.3	4 00
3 50	18 28.3	117.6	17 41.6	118.3	16. 54.8	119.0	16 07.8	119.6	15 20.6	120.3	3 50
40	20 01.5	119.7	19 14.1	120.4	18 26.7	121.0	17 39.1	121.7	16 51.4	122.3	40
30	21 32.5	121.8	20 44.7	122.5	19 56.6	123.1	19 08.4	123.8	18 20.0	124.4	30
20	23 01.6	124.0	22 13.1	124.6	21 24.3	125.2	20 35.4	125.9	19 46.4	126.5	20
10	24 28.4	126.2	23 39.1	126.8	22 49.7	127.4	22 00.2	128.1	21 10.4	128.7	10
3 00	25 52.8	128.5	25 02.8	129.1	24 12.7	129.7	23 22.4	130.3	22 32.1	130.9	3 00
2 50	27 14.4	130.8	26 23.9	131.4	25 32.9	132.0	24 42.0	132.6	23 50.8	133.2	2 50
40	28 33.3	133.2	27 41.9	133.8	26 50.3	134.4	25 58.6	134.9	25 06.8	135.5	40
30	29 49.0	135.7	28 56.8	136.2	28 04.5	136.8	27 12.0	137.3	26 19.4	137.9	30
20	31 01.5	138.2	30 08.5	138.7	29 15.4	139.3	28 22.2	139.8	27 29.0	140.3	20
10	32 10.3	140.8	31 16.7	141.3	30 22.8	141.8	29 28.9	142.3	28 34.8	142.8	10
2 00	33 15.5	143.4	32 21.1	144.0	31 26.5	144.4	30 31.9	144.9	29 37.1	145.4	2 00
1 50	34 16.7	146.2	33 21.4	146.7	32 26.2	147.1	31 30.8	147.6	30 35.3	148.0	1 50
40	35 13.6	149.0	34 17.7	149.4	33 21.7	149.8	32 25.6	150.3	31 29.4	150.7	40
30	36 05.8	151.9	35 09.2	152.3	34 12.7	152.7	33 15.9	153.1	32 19.1	153.4	30
20	36 53.5	154.8	35 56.3	155.2	34 59.0	155.5	34 01.6	155.9	33 04.2	156.2	20
10	37 36.2	157.8	36 38.4	158.1	35 40.4	158.4	34 42.6	158.8	33 44.5	159.1	10
1 00	38 13.7	160.8	37 15.3	161.1	36 16.9	161.4	35 18.4	161.7	34 19.9	162.0	1 00
0 50	38 45.7	163.9	37 46.9	164.2	36 48.0	164.5	35 49.1	164.7	34 50.1	164.9	0 50
40	39 12.2	167.1	38 13.0	167.3	37 13.7	167.5	36 14.4	167.7	35 15.1	167.9	40
30	39 33.0	170.3	38 33.4	170.4	37 33.9	170.6	36 34.2	170.7	35 34.7	170.9	30
20	39 48.0	173.5	38 48.2	173.6	37 48.4	173.7	36 48.6	173.8	35 48.8	173.9	20
10	39 56.9	176.7	38 57.0	176.8	37 57.0	176.8	36 57.2	176.9	35 57.2	177.0	10
0 00	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 36.1	105.9	0 52.7	106.6	0 09.2	107.3					5 10
5 00	3 17.6	107.7	2 33.9	108.4	1 50.1	109.1	1 06.3	109.7	0 22.4	110.4	5 00
4 50	4 58.2	109.5	4 13.9	110.2	3 29.7	110.9	2 45.5	111.5	2 01.2	112.2	4 50
40	6 37.6	111.3	5 52.9	112.0	5 08.2	112.7	4 23.5	113.3	3 38.8	114.0	40
30	8 15.7	113.1	7 30.5	113.8	6 45.5	114.5	6 00.1	115.1	5 15.0	115.8	30
20	9 52.5	115.0	9 06.9	115.7	8 21.2	116.4	7 35.5	117.0	6 49.7	117.7	20
10	11 27.9	117.0	10 41.7	117.6	9 55.5	118.3	9 09.1	118.9	8 22.8	119.6	10
4 00	13 01.6	118.9	12 14.9	119.5	11 28.1	120.2	10 41.2	120.8	9 54.2	121.5	4 00
3 50	14 33.5	120.9	13 46.2	121.5	12 58.9	122.2	12 11.2	122.8	11 23.7	123.4	3 50
40	16 03.6	122.9	15 15.6	123.5	14 27.6	124.2	13 39.5	124.8	12 51.2	125.4	40
30	17 31.6	125.0	16 43.0	125.6	15 54.3	126.2	15 05.5	126.8	14 16.6	127.4	30
20	18 57.3	127.1	18 08.1	127.7	17 18.7	128.3	16 29.3	128.9	15 39.7	129.5	20
10	20 20.7	129.3	19 30.8	129.9	18 40.7	130.4	17 50.6	131.0	18 12.4	131.6	10
3 00	21 41.6	131.5	20 50.9	132.1	20 00.1	132.6	19 09.3	133.2	18 18.3	133.7	3 00
2 50	22 59.6	133.7	22 08.2	134.3	21 16.8	134.8	20 25.1	135.4	19 33.9	135.9	2 50
40	24 14.8	136.0	23 22.8	136.6	22 30.5	137.1	21 38.2	137.6	20 45.9	138.2	40
30	25 26.8	138.4	24 34.0	138.9	23 41.2	139.4	22 48.1	139.9	21 55.0	140.5	30
20	26 35.5	140.8	25 42.0	141.3	24 48.4	141.8	23 54.7	142.3	23 00.8	142.8	20
10	27 40.8	143.3	26 46.5	143.8	25 52.2	144.3	24 57.8	144.7	24 03.2	145.2	10
2 00	28 42.2	145.8	27 47.2	146.3	26 52.2	146.8	25 57.1	147.2	25 01.9	147.6	2 00
1 50	29 39.8	148.4	28 44.2	148.9	27 48.5	149.3	26 52.6	149.7	25 56.8	150.1	1 50
40	30 33.2	151.1	29 36.9	151.5	28 40.5	151.9	27 44.1	152.3	26 47.6	152.7	40
30	31 22.3	153.8	30 25.3	154.2	29 28.2	154.5	28 31.3	154.9	27 34.1	155.3	30
20	32 06.8	156.6	31 09.2	156.9	30 11.7	157.2	29 14.0	157.6	28 16.3	157.9	20
10	32 46.5	159.4	31 48.5	159.7	30 50.3	160.0	29 52.2	160.3	28 54.1	160.5	10
1 00	33 21.4	162.2	32 22.8	162.5	31 24.1	162.8	30 25.6	163.0	29 27.0	163.3	1 00
0 50	33 51.2	165.1	32 52.2	165.4	31 53.2	165.6	30 54.2	165.8	29 55.1	166.0	0 50
40	34 15.8	168.1	33 16.4	168.2	32 17.1	168.4	31 17.7	168.6	30 18.3	168.8	40
30	34 35.1	171.0	33 35.5	171.1	32 35.8	171.3	31 36.1	171.4	30 36.6	171.5	30
20	34 48.9	174.0	33 49.1	174.1	32 49.2	174.2	31 49.4	174.3	30 49.5	174.3	20
10	34 57.2	177.0	33 57.3	177.0	32 57.3	177.1	31 57.3	177.1	30 57.3	177.1	10
0 00	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	1 16.9	112.9	0 32.6	113.5							4 50
40	2 54.0	114.7	2 09.2	115.3	1 24.4	116.0	0 39.6	116.7			40
30	4 29.7	116.5	3 44.2	117.1	2 59.0	117.8	2 13.6	118.5	1 28.2	119.1	30
20	6 03.8	118.3	5 17.9	119.0	4 32.0	119.6	3 46.0	120.3	3 00.1	120.9	20
10	7 36.4	120.2	6 49.9	120.8	6 03.4	121.5	5 16.9	122.1	4 30.1	122.7	10
4 00	9 07.2	122.1	8 20.1	122.7	7 32.9	123.4	6 45.7	124.0	5 58.4	124.6	4 00
3 50	10 36.0	124.0	9 48.3	124.6	9 00.5	125.3	8 12.7	125.9	7 24.7	126.5	3 50
40	12 03.0	126.0	11 14.6	126.6	10 26.1	127.2	9 37.6	127.8	8 49.0	128.4	40
30	13 27.7	128.0	12 38.6	128.6	11 49.5	129.2	11 00.2	129.8	10 11.0	130.3	30
20	14 50.0	130.1	14 00.3	130.6	13 10.5	131.2	12 20.6	131.8	11 30.7	132.3	20
10	16 09.9	132.2	15 19.5	132.7	14 29.1	133.3	13 38.5	133.8	12 47.7	134.3	10
3 00	17 27.3	134.3	16 36.1	134.8	15 44.9	135.4	14 53.6	135.9	14 02.3	136.4	3 00
2 50	18 41.8	136.5	17 49.9	137.0	16 57.9	137.5	16 06.0	138.0	15 13.9	138.5	2 50
40	19 53.3	138.7	19 00.8	139.2	18 08.1	139.7	17 15.4	140.2	16 22.6	140.7	40
30	21 01.8	141.0	20 08.5	141.4	19 15.1	141.9	18 21.8	142.4	17 28.2	142.9	30
20	22 06.9	143.3	21 12.9	143.7	20 18.9	144.2	19 24.8	144.7	18 30.6	145.1	20
10	23 08.7	145.7	22 13.8	146.1	21 19.2	146.5	20 24.4	147.0	19 29.6	147.4	10
2 00	24 06.6	148.1	23 11.2	148.5	22 15.8	148.9	21 20.4	149.3	20 24.9	149.7	2 00
1 50	25 00.8	150.5	24 04.8	150.9	23 08.8	151.3	22 12.7	151.7	21 16.5	152.1	1 50
40	25 51.0	153.0	24 54.3	153.4	23 57.6	153.8	23 00.9	154.1	22 04.2	154.5	40
30	26 36.9	155.6	25 39.8	155.9	24 42.6	156.3	23 45.1	156.6	22 47.9	156.9	30
20	27 18.6	158.2	26 20.8	158.5	25 23.0	158.8	24 25.2	159.1	23 27.4	159.4	20
10	27 55.8	160.8	26 57.5	161.1	25 59.2	161.3	25 01.0	161.6	24 02.7	161.8	10
1 00	28 28.3	163.5	27 29.6	163.7	26 30.9	163.9	25 32.1	164.2	24 33.4	164.4	1 00
0 50	28 56.0	166.2	27 56.9	166.4	26 57.9	166.6	25 58.9	166.8	24 59.6	167.0	0 50
40	29 18.9	168.9	28 19.5	169.1	27 20.1	169.2	26 20.7	169.4	25 21.3	169.5	40
30	29 36.8	171.6	28 37.1	171.8	27 37.6	171.9	26 37.8	172.0	25 38.2	172.1	30
20	29 49.7	174.4	28 49.8	174.5	27 50.0	174.6	26 50.2	174.7	25 50.3	174.8	20
10	29 57.4	177.2	28 57.4	177.2	27 57.6	177.3	26 57.6	177.3	25 57.6	177.4	10
0 00	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	0 42.7	119.8									4 30
20	2 14.0	121.6	1 28.0	122.2	0 41.9	122.8					20
10	3 43.5	123.4	2 56.8	124.0	2 10.1	124.6	1 23.3	125.3	0 36.6	125.9	10
4 00	5 11.2	125.2	4 23.8	125.8	3 36.5	126.4	2 49.1	127.0	2 01.6	127.6	4 00
3 50	6 36.7	127.1	5 48.8	127.7	5 00.7	128.3	4 12.7	128.9	3 24.5	129.5	3 50
40	8 00.3	129.0	7 11.7	129.6	6 22.9	130.2	5 34.2	130.8	4 45.4	131.4	40
30	9 21.7	130.9	8 32.3	131.5	7 42.8	132.1	6 53.3	132.7	6 03.7	133.2	30
20	10 40.7	132.9	9 50.6	133.5	9 00.4	134.0	8 10.2	134.6	7 19.9	135.1	20
10	11 57.0	134.9	11 06.2	135.5	10 15.4	136.0	9 24.4	136.5	8 33.4	137.1	10
3 00	13 10.8	137.0	12 19.3	137.5	11 27.8	138.0	10 36.1	138.5	9 44.4	139.1	3 00
2 50	14 21.7	139.1	13 29.5	139.6	12 37.2	140.1	11 44.8	140.6	10 52.4	141.1	2 50
40	15 29.7	141.2	14 36.8	141.7	13 43.8	142.2	12 50.7	142.6	11 57.6	143.1	40
30	16 34.7	143.4	15 41.0	143.8	14 47.3	144.3	13 53.6	144.7	12 59.7	145.2	30
20	17 36.3	145.7	16 42.0	146.0	15 47.7	146.5	14 53.2	146.9	13 58.7	147.3	20
10	18 34.6	147.8	17 39.6	148.2	16 44.5	148.7	15 49.3	149.1	14 54.2	149.5	10
2 00	19 29.3	150.1	18 33.6	150.5	17 37.9	150.9	16 42.2	151.3	15 46.4	151.7	2 00
1 50	20 20.2	152.4	19 24.0	152.8	18 27.7	153.2	17 31.2	153.5	16 35.0	153.9	1 50
40	21 07.4	154.8	20 10.5	155.1	19 13.6	155.5	18 16.6	155.8	17 19.7	156.2	40
30	21 50.5	157.2	20 53.1	157.5	19 55.6	157.8	18 58.1	158.1	18 00.7	158.5	30
20	22 29.5	159.6	21 31.6	159.9	20 33.6	160.2	19 35.6	160.5	18 37.6	160.8	20
10	23 04.2	162.1	22 05.8	162.4	21 07.5	162.6	20 09.0	162.9	19 10.5	163.1	10
1 00	23 34.6	164.6	22 35.8	164.8	21 37.0	165.1	20 38.2	165.3	19 39.3	165.5	1 00
0 50	24 00.5	167.1	23 01.3	167.3	22 02.2	167.5	21 03.0	167.7	20 03.7	167.8	0 50
40	24 21.8	169.7	23 22.4	169.8	22 22.9	170.0	21 23.4	170.1	20 24.0	170.3	40
30	24 38.5	172.2	23 38.8	172.3	22 39.2	172.5	21 39.4	172.6	20 39.7	172.7	30
20	24 50.5	174.8	23 50.6	174.9	22 50.7	175.0	21 50.9	175.0	20 51.0	175.1	20
10	24 57.7	177.4	23 57.7	177.4	22 57.7	177.5	21 57.7	177.5	20 57.7	177.5	10
0 00	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 25.4	86.1	1 08.6	85.4	6 10
6 00	0 00.0	90.0	0 43.2	89.3	1 26.3	88.6	2 09.5	87.9	2 52.6	87.2	6 00
5 50	1 44.2	91.8	2 27.4	91.1	3 10.5	90.4	3 53.7	89.7	4 36.8	89.0	5 50
40	3 28.3	93.6	4 11.5	92.9	4 54.6	92.2	5 37.8	91.5	6 20.8	90.8	40
30	5 12.2	95.4	5 55.4	94.7	6 38.7	94.0	7 21.9	93.3	8 05.0	92.6	30
20	6 55.7	97.2	7 39.1	96.5	8 22.5	95.8	9 05.8	95.1	9 49.0	94.4	20
10	8 38.8	99.0	9 22.4	98.3	10 06.0	97.6	10 49.6	96.9	11 32.8	96.2	10
5 00	10 21.5	100.9	11 05.3	100.2	11 49.0	99.5	12 32.6	98.8	13 16.1	98.1	5 00
4 50	12 03.4	102.8	12 47.5	102.1	13 31.5	101.4	14 15.4	100.7	14 59.1	100.0	4 50
40	13 44.7	104.7	14 29.0	104.0	15 13.3	103.3	15 57.4	102.6	16 41.3	101.9	40
30	15 25.0	106.6	16 09.8	105.9	16 54.2	105.2	17 38.7	104.5	18 22.9	103.8	30
20	17 04.3	108.5	17 49.4	107.8	18 34.3	107.2	19 19.1	106.5	20 03.7	105.8	20
10	18 42.5	110.5	19 28.0	109.8	20 13.3	109.2	20 58.5	108.5	21 43.4	107.8	10
4 00	20 19.4	112.5	21 05.3	111.9	21 51.1	111.2	22 36.7	110.5	23 22.1	109.8	4 00
3 50	21 55.0	114.6	22 41.4	113.9	23 27.6	113.2	24 13.8	112.5	24 59.6	111.8	3 50
40	23 28.8	116.7	24 15.7	116.0	25 02.5	115.4	25 49.1	114.7	26 35.5	114.0	40
30	25 01.0	118.9	25 48.6	118.2	26 35.9	117.6	27 23.1	116.9	28 09.9	116.2	30
20	26 31.2	121.1	27 19.3	120.5	28 07.3	119.8	28 55.1	119.1	29 42.6	118.4	20
10	27 59.3	123.4	28 48.1	122.7	29 36.7	122.1	30 25.2	121.4	31 13.2	120.7	10
3 00	29 25.1	125.7	30 14.6	125.1	31 03.8	124.4	31 52.9	123.7	32 41.7	123.1	3 00
2 50	30 48.4	128.1	31 38.6	127.5	32 28.5	126.8	33 18.4	126.2	34 07.8	125.5	2 50
40	32 09.0	130.6	32 59.9	130.0	33 50.6	129.3	34 41.1	128.7	35 31.3	128.0	40
30	33 26.6	133.2	34 18.2	132.6	35 09.7	131.9	36 00.9	131.3	36 51.9	130.6	30
20	34 41.0	135.8	35 33.4	135.2	36 25.6	134.6	37 17.6	134.0	38 09.4	133.3	20
10	35 51.8	138.5	36 45.0	137.9	37 38.1	137.3	38 31.0	136.7	39 23.4	136.1	10
2 00	36 59.0	141.3	37 52.9	140.7	38 46.7	140.1	39 40.4	139.6	40 33.8	139.0	2 00
1 50	38 02.2	144.1	38 56.9	143.6	39 51.5	143.1	40 46.0	142.5	41 40.2	141.9	1 50
40	39 01.1	147.0	39 56.6	146.6	40 51.9	146.1	41 47.1	145.5	42 42.2	145.0	40
30	39 55.4	150.1	40 51.8	149.6	41 47.8	149.1	42 43.9	148.7	43 39.7	148.2	30
20	40 45.0	153.2	41 41.9	152.8	42 38.8	152.3	43 35.5	151.9	44 32.1	151.4	20
10	41 29.4	156.3	42 27.1	156.0	43 24.6	155.6	44 22.1	155.2	45 19.2	154.8	10
1 00	42 08.6	159.6	43 06.7	159.3	44 04.8	158.9	45 02.9	158.6	46 00.8	158.2	1 00
0 50	42 42.2	162.9	43 40.8	162.6	44 39.5	162.3	45 38.2	162.0	46 36.8	161.7	0 50
40	43 09.9	166.2	44 09.0	166.0	45 08.2	165.8	46 07.3	165.5	47 06.3	165.3	40
30	43 31.7	169.6	44 31.2	169.5	45 30.8	169.3	46 30.3	169.1	47 29.8	168.9	30
20	43 47.4	173.0	44 47.2	172.9	45 46.9	172.8	46 46.7	172.7	47 46.4	172.6	20
10	43 56.8	176.5	44 56.8	176.5	45 56.8	176.4	46 56.8	176.3	47 56.6	176.3	10
0 00	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30							0 35.5	79.1	1 19.1	78.4	6 30
20	0 08.2	82.9	0 51.5	82.2	1 34.8	81.6	2 18.1	80.9	3 01.4	80.2	20
10	1 51.8	84.7	2 35.0	84.0	3 18.1	83.3	4 01.3	82.7	4 44.3	81.9	10
6 00	3 35.7	86.5	4 18.7	85.8	5 01.8	85.1	5 44.7	84.4	6 27.6	83.7	6 00
5 50	5 19.8	88.3	6 02.8	87.6	6 45.7	86.9	7 28.7	86.2	8 11.4	85.5	5 50
40	7 03.9	90.1	7 46.8	89.4	8 29.8	88.7	9 12.6	88.0	9 55.4	87.3	40
30	8 48.1	91.9	9 31.1	91.2	10 13.9	90.5	10 56.8	89.8	11 39.6	89.1	30
20	10 32.1	93.7	11 15.2	93.0	11 58.2	92.3	12 41.0	91.6	13 23.7	90.9	20
10	12 16.0	95.5	12 59.2	94.8	13 42.2	94.1	14 25.1	93.4	15 07.9	92.7	10
5 00	13 59.6	97.4	14 42.8	96.7	15 26.0	96.0	16 09.0	95.3	16 51.9	94.5	5 00
4 50	15 42.6	99.3	15 26.1	98.5	17 09.4	97.8	17 52.6	97.1	18 35.6	96.4	4 50
40	17 25.2	101.2	18 08.9	100.4	18 52.4	99.7	19 35.8	99.0	20 19.0	98.2	40
30	19 07.0	103.1	19 51.0	102.3	20 34.8	101.6	21 18.5	100.9	22 01.8	100.1	30
20	20 48.2	105.0	21 32.4	104.3	22 16.5	103.6	23 00.4	102.8	23 44.1	102.1	20
10	22 28.1	107.1	23 12.9	106.3	23 57.3	105.6	24 41.6	104.8	25 25.5	104.1	10
4 00	24 07.3	109.0	24 52.4	108.3	25 37.2	107.6	26 21.8	106.8	27 06.2	106.1	4 00
3 50	25 45.2	111.1	26 30.7	110.4	27 15.9	109.7	28 01.1	108.9	28 45.7	108.2	3 50
40	27 21.7	113.2	28 07.7	112.5	28 53.4	111.8	29 38.9	111.0	30 24.1	110.3	40
30	28 56.7	115.4	29 43.2	114.7	30 29.5	114.0	31 15.4	113.2	32 01.2	112.4	30
20	30 29.9	117.7	31 17.0	116.9	32 03.8	116.2	32 50.3	115.5	33 36.6	114.7	20
10	32 01.2	120.0	32 48.8	119.2	33 36.2	118.5	34 23.6	117.8	35 10.4	117.0	10
3 00	33 30.3	122.4	34 18.7	121.6	35 06.9	120.9	35 54.7	120.2	36 42.2	119.4	3 00
2 50	34 57.2	124.8	35 46.2	124.1	36 35.0	123.4	37 23.7	122.6	38 11.9	121.9	2 50
40	36 21.4	127.3	37 11.2	126.6	38 00.8	125.9	38 50.1	125.2	39 39.1	124.5	40
30	37 42.8	130.0	38 33.3	129.3	39 23.7	128.6	40 13.9	127.9	41 03.6	127.1	30
20	39 01.0	132.7	39 52.4	132.0	40 43.6	131.3	41 34.5	130.6	42 25.2	129.9	20
10	40 16.0	135.5	41 08.2	134.8	42 00.1	134.2	42 52.0	133.5	43 43.5	132.8	10
2 00	41 27.1	138.4	42 20.2	137.7	43 13.1	137.1	44 05.7	136.4	44 58.1	135.7	2 00
1 50	42 24.2	141.4	43 28.2	140.8	44 22.0	140.2	45 15.5	139.5	46 08.8	138.8	1 50
40	43 37.1	144.5	44 31.9	143.9	45 26.5	143.3	46 20.9	142.7	47 15.1	142.1	40
30	44 35.4	147.7	45 31.0	147.1	46 26.4	146.6	47 21.8	146.0	48 16.8	145.4	30
20	45 28.6	150.9	46 25.0	150.4	47 21.3	149.9	48 17.4	149.4	49 13.4	148.9	20
10	46 16.5	154.3	47 13.7	153.9	48 10.8	153.4	49 07.7	152.9	50 04.4	152.4	10
1 00	46 58.8	157.8	47 56.6	157.4	48 54.4	157.0	49 52.1	156.6	50 49.7	156.1	1 00
0 50	47 35.2	161.4	48 33.7	161.0	49 32.1	160.7	50 30.6	160.3	51 28.8	159.9	0 50
40	48 05.4	165.0	49 04.4	164.7	50 03.4	164.4	51 02.3	164.1	52 01.2	163.8	40
30	48 29.1	168.7	49 28.5	168.5	50 27.9	168.2	51 27.4	168.0	52 26.8	167.8	30
20	48 46.2	172.4	49 45.9	172.3	50 45.7	172.1	51 45.4	172.0	52 45.1	171.8	20
10	48 56.5	176.2	49 56.5	176.1	50 56.3	176.1	51 56.3	176.0	52 56.2	175.9	10
0 00	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50					0 08.7	72.7	0 52.8	72.1	1 36.8	71.4	6 50
40	0 21.1	75.9	1 04.8	75.2	1 48.6	74.5	2 32.3	73.9	3 16.0	73.2	40
30	2 02.5	77.7	2 46.0	77.0	3 29.4	76.3	4 12.8	75.6	4 56.1	74.9	30
20	3 44.6	79.5	4 27.8	78.8	5 11.0	78.1	5 54.1	77.4	6 37.2	76.7	20
10	5 27.4	81.2	6 10.3	80.5	6 53.3	79.8	7 36.2	79.1	8 19.0	78.4	10
6 00	7 10.5	83.0	7 53.4	82.3	8 36.1	81.6	9 18.8	80.9	10 01.3	80.2	6 00
5 50	8 54.2	84.8	9 36.9	84.1	10 19.4	83.3	11 01.9	82.6	11 44.2	81.9	5 50
40	10 38.0	86.6	11 20.6	85.8	12 03.1	85.1	12 45.4	84.4	13 27.6	83.7	40
30	12 22.1	88.4	13 04.6	87.6	13 47.0	86.9	14 29.3	86.2	15 11.2	85.4	30
20	14 06.3	90.2	14 48.8	89.4	15 31.1	88.7	16 13.3	88.0	16 55.3	87.2	20
10	15 50.5	92.0	16 32.9	91.2	17 15.4	90.5	17 57.5	89.7	18 39.4	89.0	10
5 00	17 34.6	93.8	18 17.1	93.0	18 59.5	92.3	19 41.7	91.5	20 23.7	90.8	5 00
4 50	19 18.5	95.6	20 01.1	94.9	20 43.6	94.1	21 25.8	93.3	22 07.8	92.6	4 50
40	21 01.9	97.5	21 44.7	96.7	22 27.3	96.0	23 09.6	95.2	23 51.8	94.4	40
30	22 44.9	99.4	23 27.9	98.6	24 10.7	97.9	24 53.2	97.1	25 35.5	96.3	30
20	24 27.5	101.3	25 10.7	100.6	25 53.7	99.8	26 36.4	99.0	27 18.9	98.2	20
10	26 09.3	103.3	26 52.8	102.5	27 36.1	101.8	28 19.1	101.0	29 01.7	100.2	10
4 00	27 50.3	105.3	28 34.1	104.5	29 17.7	103.8	30 01.0	103.0	30 44.0	102.2	4 00
3 50	29 30.2	107.4	30 14.6	106.6	30 58.6	105.8	31 42.1	105.0	32 25.4	104.2	3 50
40	31 09.1	109.5	31 53.8	108.7	32 38.2	107.9	33 22.2	107.1	34 06.0	106.3	40
30	32 46.7	111.7	33 31.8	110.9	34 16.7	110.1	35 01.2	109.3	35 45.4	108.5	30
20	34 22.6	113.9	35 08.4	113.1	35 53.8	112.3	36 38.8	111.5	37 23.6	110.7	20
10	35 57.1	116.2	36 43.4	115.5	37 29.4	114.6	38 15.1	113.8	39 00.2	113.0	10
3 00	37 29.5	118.6	38 16.5	117.9	39 03.1	117.0	39 49.4	116.2	40 35.4	115.4	3 00
2 50	38 59.9	121.1	39 47.6	120.3	40 34.8	119.5	41 21.9	118.7	42 08.5	117.9	2 50
40	40 27.9	123.7	41 16.3	122.9	42 04.4	122.1	42 52.1	121.3	43 39.5	120.5	40
30	41 53.1	126.3	42 42.5	125.6	43 31.4	124.8	44 19.9	124.0	45 08.0	123.1	30
20	43 15.5	129.1	44 05.7	128.4	44 55.4	127.6	45 44.8	126.8	46 33.9	125.9	20
10	44 34.7	132.0	45 25.6	131.3	46 16.3	130.5	47 06.7	129.7	47 56.6	128.9	10
2 00	45 50.2	135.0	46 42.1	134.3	47 33.7	133.6	48 25.0	132.8	49 15.9	132.0	2 00
1 50	47 01.8	138.2	47 54.7	137.5	48 47.3	136.7	49 39.5	136.0	50 31.4	135.2	1 50
40	48 09.1	141.4	49 02.9	140.7	49 56.4	140.0	50 49.6	139.3	51 42.6	138.6	40
30	49 11.8	144.8	50 06.5	144.1	51 01.0	143.5	51 55.1	142.8	52 49.2	142.1	30
20	50 09.2	148.3	51 04.9	147.7	52 00.3	147.1	52 55.5	146.5	53 50.6	145.8	20
10	51 01.1	151.9	51 57.7	151.4	52 54.0	150.8	53 50.4	150.2	54 46.1	149.6	10
1 00	51 47.1	155.7	52 44.5	155.2	53 41.7	154.7	54 38.8	154.2	55 35.8	153.6	1 00
0 50	52 26.9	159.6	53 25.0	159.2	54 23.0	158.7	55 21.0	158.3	56 18.7	157.8	0 50
40	53 00.0	163.5	53 58.7	163.2	54 57.4	162.8	55 56.0	162.4	56 54.6	162.0	40
30	53 26.1	167.6	54 25.4	167.3	55 24.5	167.0	56 23.8	166.7	57 22.8	166.4	30
20	53 44.8	171.7	54 44.5	171.5	55 44.1	171.3	56 43.8	171.1	57 43.4	170.9	20
10	53 56.1	175.8	54 56.1	175.7	55 56.1	175.6	56 56.0	175.5	57 55.8	175.4	10
0 00	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20									0 32.8	62.7	7 20
10					0 36.3	65.8	1 21.1	65.2	2 06.1	64.5	10
7 00	0 43.1	68.9	1 27.6	68.3	2 12.0	67.6	2 56.4	66.9	3 40.9	66.2	7 00
6 50	2 20.8	70.7	3 04.9	70.0	3 48.9	69.4	4 32.8	68.6	5 16.8	68.0	6 50
40	3 59.8	72.5	4 43.4	71.8	5 27.0	71.1	6 10.5	70.4	6 54.0	69.7	40
30	5 39.5	74.2	6 22.8	73.5	7 06.1	72.8	7 49.1	72.1	8 32.2	71.4	30
20	7 20.2	76.0	8 03.2	75.3	8 46.0	74.6	9 28.8	73.9	10 11.5	73.1	20
10	9 01.7	77.7	9 44.3	77.0	10 26.9	76.3	11 09.3	75.6	11 51.7	74.8	10
6 00	10 43.8	79.5	11 26.2	78.7	12 08.5	78.0	12 50.6	77.3	13 32.6	76.6	6 00
5 50	12 26.5	81.2	13 08.7	80.4	13 50.7	79.7	14 32.6	79.0	15 14.3	78.3	5 50
40	14 09.7	82.9	14 51.6	82.2	15 33.4	81.4	16 15.1	80.7	16 56.7	80.0	40
30	15 53.3	84.7	16 35.1	83.9	17 16.8	83.2	17 58.1	82.4	18 39.5	81.7	30
20	17 37.1	86.4	18 18.8	85.7	19 00.3	84.9	19 41.6	84.2	20 22.8	83.4	20
10	19 21.2	88.2	20 02.9	87.4	20 44.3	86.6	21 25.5	85.9	22 06.5	85.1	10
5 00	21 05.4	90.0	21 47.0	89.2	22 28.4	88.4	23 09.5	87.7	23 50.4	86.9	5 00
4 50	22 49.6	91.8	23 31.1	91.0	24 12.5	90.2	24 53.7	89.4	25 34.4	88.6	4 50
40	24 33.7	93.6	25 15.3	92.9	25 56.7	92.1	26 37.9	91.2	27 18.7	90.4	40
30	26 17.5	95.5	26 59.2	94.7	27 40.8	93.9	28 21.9	93.0	29 02.8	92.2	30
20	28 01.1	97.4	28 43.0	96.6	29 24.6	95.8	30 05.9	94.9	30 46.9	94.1	20
10	29 44.1	99.3	30 26.2	98.5	31 08.1	97.7	31 49.6	96.8	32 30.7	96.0	10
4 00	31 26.7	101.3	32 09.1	100.5	32 51.1	99.7	33 32.8	98.8	34 14.2	97.9	4 00
3 50	33 08.4	103.4	33 51.1	102.5	34 33.5	101.7	35 15.5	100.8	35 57.0	99.9	3 50
40	34 49.4	105.5	35 32.4	104.6	36 15.1	103.7	36 57.4	102.9	37 39.4	102.0	40
30	36 29.2	107.6	37 12.7	106.8	37 55.9	105.9	38 38.6	105.0	39 20.8	104.1	30
20	38 07.9	109.8	38 52.0	109.0	39 35.5	108.1	40 18.7	107.2	41 01.5	106.3	20
10	39 45.2	112.1	40 29.8	111.3	41 14.0	110.4	41 57.7	109.5	42 41.0	108.6	10
3 00	41 20.9	114.5	42 06.1	113.6	42 50.9	112.7	43 35.2	111.8	44 19.1	110.9	3 00
2 50	42 54.8	117.0	43 40.7	116.1	44 26.0	115.2	45 11.0	114.3	45 55.6	113.3	2 50
40	44 26.5	119.6	45 13.1	118.7	45 59.3	117.8	46 45.0	116.8	47 30.3	115.9	40
30	45 55.9	122.3	46 43.3	121.4	47 30.3	120.5	48 16.9	119.5	49 03.0	118.6	30
20	47 22.5	125.1	48 10.8	124.2	48 58.7	123.3	49 46.2	122.4	50 33.2	121.4	20
10	48 46.1	128.1	49 35.5	127.2	50 24.5	126.3	51 12.8	125.4	52 00.7	124.4	10
2 00	50 06.6	131.2	50 56.8	130.3	51 46.6	129.4	52 36.1	128.5	53 25.1	127.5	2 00
1 50	51 22.8	134.4	52 14.2	133.6	53 05.2	132.7	53 55.8	131.8	54 45.9	130.8	1 50
40	52 35.3	137.8	53 27.6	137.0	54 19.7	136.1	55 11.4	135.2	56 02.7	134.3	40
30	53 42.9	141.4	54 36.4	140.6	55 29.5	139.8	56 22.2	138.9	57 14.7	138.0	30
20	54 45.4	145.1	55 39.9	144.3	56 34.2	143.6	57 28.2	142.8	58 21.8	141.9	20
10	55 42.0	149.0	56 37.7	148.3	57 33.1	147.6	58 28.1	146.8	59 23.0	146.1	10
1 00	56 32.6	153.0	57 29.2	152.4	58 25.7	151.8	59 21.9	151.1	60 18.0	150.4	1 00
0 50	57 16.4	157.3	58 13.9	156.7	59 11.5	156.2	60 08.6	155.6	61 05.9	155.0	0 50
40	57 53.0	161.6	58 51.4	161.2	59 49.7	160.7	60 47.9	160.2	61 46.0	159.7	40
30	58 22.0	166.1	59 21.1	165.8	60 20.1	165.4	61 19.1	165.0	62 17.9	164.6	30
20	58 43.0	170.7	59 42.6	170.4	60 42.1	170.2	61 41.7	169.9	62 41.2	169.7	20
10	58 55.7	175.3	59 55.5	175.2	60 55.5	175.1	61 55.4	175.0	62 55.2	174.8	10
0 00	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40							0 37.3	56.6	1 23.9	55.9	7 40
30			0 33.1	59.6	1 19.0	59.0	2 05.0	58.3	2 51.1	57.7	30
20	1 18.2	62.1	2 03.7	61.4	2 49.1	60.7	3 34.6	60.1	4 20.0	59.4	20
10	2 51.1	63.8	3 35.9	63.2	4 20.7	62.5	5 05.7	61.8	5 50.4	61.1	10
7 00	4 25.2	65.6	5 09.6	64.9	5 53.9	64.2	6 38.3	63.5	7 22.5	62.9	7 00
6 50	6 00.7	67.3	6 44.7	66.6	7 28.4	65.9	8 12.1	65.2	8 55.7	64.5	6 50
40	7 37.4	69.0	8 20.8	68.3	9 04.2	67.6	9 47.4	66.9	10 30.6	66.2	40
30	9 15.2	70.7	9 58.2	70.0	10 41.0	69.3	11 23.8	68.6	12 06.5	67.9	30
20	10 54.1	72.4	11 36.6	71.7	12 19.1	71.0	13 01.4	70.3	13 43.6	69.5	20
10	12 34.0	74.1	13 16.1	73.4	13 58.1	72.6	14 39.9	71.9	15 21.7	71.2	10
6 00	14 14.5	75.8	14 56.3	75.1	15 37.9	74.3	16 19.4	73.6	17 00.7	72.8	6 00
5 50	15 56.0	77.5	16 37.4	76.7	17 18.6	76.0	17 59.8	75.2	18 40.7	74.4	5 50
40	17 38.0	79.2	18 19.1	78.4	19 00.1	77.7	19 40.9	76.9	20 21.4	76.1	40
30	19 20.7	80.9	20 01.4	80.1	20 42.2	79.4	21 22.7	78.6	22 03.0	77.8	30
20	21 03.7	82.6	21 44.4	81.8	22 24.8	81.0	23 05.1	80.2	23 45.0	79.4	20
10	22 47.2	84.3	23 27.8	83.5	24 08.1	82.7	24 48.0	81.9	25 27.7	81.1	10
5 00	24 31.0	86.1	25 11.4	85.2	25 51.5	84.4	26 31.3	83.6	27 10.8	82.8	5 00
4 50	26 15.1	87.8	26 55.3	87.0	27 35.4	86.1	28 15.1	85.3	28 54.6	84.5	4 50
40	27 59.3	89.6	28 39.5	88.7	29 19.5	87.9	29 59.1	87.0	30 38.3	86.2	40
30	29 43.5	91.4	30 23.7	90.5	31 03.6	89.7	31 43.2	88.8	32 22.4	87.9	30
20	31 27.6	93.2	32 07.9	92.4	32 47.8	91.5	33 27.4	90.6	34 06.5	89.7	20
10	33 11.5	95.1	33 51.9	94.2	34 31.9	93.3	35 11.5	92.4	35 50.8	91.5	10
4 00	34 55.1	97.0	35 35.6	96.1	36 15.8	95.2	36 55.5	94.3	37 34.7	93.4	4 00
3 50	36 38.2	99.0	37 19.1	98.1	37 59.4	97.2	38 39.3	96.2	39 18.7	95.3	3 50
40	38 20.9	101.0	39 01.9	100.1	39 42.5	99.2	40 22.7	98.2	41 02.3	97.2	40
30	40 02.8	103.1	40 44.2	102.2	41 25.2	101.2	42 05.5	100.2	42 45.5	99.2	30
20	41 43.7	105.3	42 25.6	104.4	43 06.9	103.4	43 47.7	102.3	44 27.9	101.3	20
10	43 23.7	107.6	44 06.0	106.6	44 47.8	105.6	45 29.1	104.5	46 09.7	103.5	10
3 00	45 02.5	109.9	45 45.3	108.9	46 27.6	107.8	47 09.4	106.8	47 50.5	105.8	3 00
2 50	46 39.6	112.3	47 23.1	111.3	48 06.0	110.3	48 48.4	109.2	49 39.2	108.1	2 50
40	48 15.1	114.9	48 59.3	113.9	49 43.0	112.8	50 26.1	111.7	51 08.5	110.6	40
30	49 48.7	117.6	50 33.5	116.6	51 18.0	115.5	52 02.0	114.4	52 45.2	113.3	30
20	51 19.7	120.4	52 05.6	119.4	52 51.0	118.3	53 35.8	117.2	54 19.9	116.0	20
10	52 48.2	123.4	53 35.1	122.3	54 21.5	121.2	55 07.2	120.1	55 52.4	119.0	10
2 00	54 13.6	126.5	55 01.6	125.5	55 49.0	124.4	56 35.9	123.3	57 22.1	122.2	2 00
1 50	55 35.5	129.8	56 24.6	128.8	57 13.2	127.7	58 01.3	126.6	58 48.7	125.5	1 50
40	56 53.5	133.4	57 43.8	132.4	58 33.6	131.3	59 23.0	130.2	60 11.6	129.1	40
30	58 07.0	137.1	58 58.5	136.2	59 49.5	135.2	60 40.2	134.1	61 30.2	133.0	30
20	59 15.1	141.0	60 08.0	140.1	61 00.5	139.2	61 52.6	138.1	62 44.1	137.0	20
10	60 17.6	145.3	61 12.0	144.4	62 05.6	143.5	62 59.3	142.5	63 52.3	141.5	10
1 00	61 13.8	149.7	62 09.3	148.9	63 04.5	148.0	63 59.4	147.1	64 53.8	146.1	1 00
0 50	62 02.7	154.3	62 59.4	153.6	63 56.0	152.8	64 52.1	152.0	65 48.2	151.2	0 50
40	62 44.0	159.1	63 41.7	158.5	64 39.4	157.9	65 36.8	157.2	66 34.0	156.5	40
30	63 16.9	164.2	64 15.4	163.7	65 14.1	163.2	66 12.5	162.7	67 10.9	162.1	30
20	63 40.6	169.4	64 40.0	169.1	65 39.3	168.7	66 38.6	168.3	67 37.8	167.9	20
10	63 55.2	174.7	64 54.9	174.5	65 54.7	174.3	66 54.7	174.1	67 54.5	173.9	10
0 00	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	1 44. 2	91. 8	1 01. 1	92. 5	0 17. 8	93. 2					5 50
40	3 28. 3	93. 6	2 45. 0	94. 3	2 01. 7	95. 0	1 18. 4	95. 7	0 35. 1	96. 4	40
30	5 12. 2	95. 4	4 28. 8	96. 1	3 45. 4	96. 8	3 01. 9	97. 5	2 18. 2	98. 2	30
20	6 55. 7	97. 2	6 12. 2	97. 9	5 28. 6	98. 6	4 45. 0	99. 3	4 01. 3	100. 0	20
10	8 38. 8	99. 0	7 55. 2	99. 7	7 11. 4	100. 4	6 27. 6	101. 1	5 43. 7	101. 8	10
5 00	10 21. 5	100. 9	9 37. 6	101. 6	8 53. 6	102. 3	8 09. 5	103. 0	7 25. 3	103. 7	5 00
4 50	12 03. 4	102. 8	11 19. 2	103. 5	10 35. 0	104. 2	9 50. 7	104. 8	9 06. 2	105. 5	4 50
40	13 44. 7	104. 7	13 00. 2	105. 4	12 15. 6	106. 1	11 30. 8	106. 7	10 46. 0	107. 4	40
30	15 25. 0	106. 6	14 40. 2	107. 3	13 55. 2	108. 0	13 10. 1	108. 6	12 24. 9	109. 3	30
20	17 04. 3	108. 5	16 19. 1	109. 2	15 33. 8	109. 9	14 48. 3	110. 6	14 02. 7	111. 3	20
10	18 42. 5	110. 5	17 56. 9	111. 2	17 11. 1	111. 9	16 25. 1	112. 6	15 39. 1	113. 2	10
4 00	20 19. 4	112. 5	19 33. 3	113. 2	18 47. 0	113. 9	18 00. 6	114. 6	17 14. 1	115. 2	4 00
3 50	21 55. 0	114. 6	21 08. 4	115. 3	20 21. 5	116. 0	19 34. 8	116. 6	18 47. 6	117. 3	3 50
40	23 28. 8	116. 7	22 41. 7	117. 4	21 54. 4	118. 1	21 06. 9	118. 7	20 19. 3	119. 4	40
30	25 01. 0	118. 9	24 13. 3	119. 6	23 25. 5	120. 2	22 37. 3	120. 9	21 49. 1	121. 5	30
20	26 31. 2	121. 1	25 42. 9	121. 8	24 54. 4	122. 4	24 05. 7	123. 1	23 16. 9	123. 7	20
10	27 59. 3	123. 4	27 10. 4	124. 1	26 21. 2	124. 7	25 31. 9	125. 3	24 42. 4	125. 9	10
3 00	29 25. 1	125. 7	28 35. 5	126. 4	27 45. 7	127. 0	26 55. 6	127. 6	26 05. 5	128. 2	3 00
2 50	30 48. 4	128. 1	29 58. 1	128. 8	29 07. 6	129. 4	28 16. 9	130. 0	27 26. 0	130. 6	2 50
40	32 09. 0	130. 6	31 17. 9	131. 2	30 26. 7	131. 8	29 35. 3	132. 4	28 43. 7	133. 0	40
30	33 26. 6	133. 2	32 34. 8	133. 8	31 42. 8	134. 3	30 50. 7	134. 9	29 58. 3	135. 5	30
20	34 41. 0	135. 8	33 48. 4	136. 4	32 55. 7	136. 9	32 02. 8	137. 5	31 09. 7	138. 0	20
10	35 51. 8	138. 5	34 58. 5	139. 1	34 05. 1	139. 6	33 11. 5	140. 1	32 17. 6	140. 6	10
2 00	36 59. 0	141. 3	36 04. 9	141. 8	35 10. 6	142. 3	34 16. 2	142. 8	33 21. 7	143. 3	2 00
1 50	38 02. 2	144. 1	37 07. 3	144. 6	36 12. 4	145. 1	35 17. 2	145. 6	34 22. 0	146. 1	1 50
40	39 01. 1	147. 0	38 05. 5	147. 5	37 09. 8	148. 0	36 13. 9	148. 5	35 18. 0	148. 9	40
30	39 55. 4	150. 1	38 59. 2	150. 5	38 02. 8	151. 0	37 06. 2	151. 4	36 09. 6	151. 8	30
20	40 45. 0	153. 2	39 48. 0	153. 6	38 50. 9	154. 0	37 53. 7	154. 4	36 56. 5	154. 7	20
10	41 29. 4	156. 3	40 31. 8	156. 7	39 34. 2	157. 1	38 36. 3	157. 4	37 38. 4	157. 7	10
1 00	42 08. 6	159. 6	41 10. 4	159. 9	40 12. 0	160. 2	39 13. 7	160. 5	38 15. 3	160. 8	1 00
0 50	42 42. 2	162. 9	41 43. 4	163. 2	40 44. 7	163. 4	39 45. 8	163. 7	38 46. 9	163. 9	0 50
40	43 09. 9	166. 2	42 10. 7	166. 5	41 11. 5	166. 7	40 12. 3	166. 9	39 13. 0	167. 1	40
30	43 31. 7	169. 6	42 32. 2	169. 8	41 32. 7	170. 0	40 33. 1	170. 1	39 33. 5	170. 3	30
20	43 47. 4	173. 0	42 47. 6	173. 2	41 47. 8	173. 3	40 47. 9	173. 4	39 48. 1	173. 5	20
10	43 56. 8	176. 5	42 56. 9	176. 6	41 57. 0	176. 6	40 57. 0	176. 7	39 57. 0	176. 6	10
0 00	44 0. 0	180. 0	43 0. 0	180. 0	42 0. 0	180. 0	41 0. 0	180. 0	40 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 34.9	98.9	0 51.5	99.6	0 08.0	100.3					5 30
20	3 17.6	100.7	2 33.9	101.4	1 50.2	102.1	1 06.5	102.7	0 22.7	103.4	20
10	4 59.8	102.5	4 15.8	103.2	3 31.9	103.9	2 47.8	104.5	2 03.7	105.2	10
5 00	6 41.1	104.3	5 56.9	105.0	5 12.6	105.7	4 28.2	106.4	3 43.8	107.1	5 00
4 50	8 21.6	106.2	7 37.0	106.9	6 52.4	107.5	6 07.6	108.2	5 22.9	108.9	4 50
40	10 01.2	108.1	9 16.2	108.8	8 31.2	109.4	7 46.1	110.1	7 00.9	110.8	40
30	11 39.7	110.0	10 54.3	110.7	10 08.9	111.3	9 23.4	112.0	8 37.7	112.7	30
20	13 17.0	111.9	12 31.2	112 6	11 45.3	113.2	10 59.3	113.9	10 13.2	114.6	20
10	14 52.9	113.9	14 06.7	114.6	13 20.3	115.2	12 33.8	115.9	11 47.2	116.5	10
4 00	16 27.5	115.9	15 40.7	116.6	14 53.8	117.2	14 06.8	117.9	13 19.7	118.5	4 00
3 50	18 00.4	117.9	17 13.1	118.6	16 25.6	119.2	15 38.1	119.9	14 50.4	120.5	3 50
40	19 31.6	120.0	18 43.7	120.7	17 55.6	121.3	17 07.5	121.9	16 19.2	122.5	40
30	21 00.8	122.1	20 12.3	122.8	19 23.7	123.4	18 34.9	124.0	17 46.1	124.6	30
20	22 27.9	124.3	21 38.8	125.0	20 49.6	125.6	20 00.2	126.2	19 10.7	126.8	20
10	23 52.8	126.5	23 03.0	127.2	22 13.2	127.8	21 23.1	128.4	20 32.9	129.0	10
3 00	25 15.2	128.8	24 24.8	129.4	23 34.2	130.0	22 43.5	130.6	21 52.7	131.2	3 00
2 50	26 35.1	131.2	25 43.9	131.8	24 52.6	132.3	24 01.2	132.9	23 09.7	133.5	2 50
40	27 52.0	133.6	27 00.2	134.2	26 08.2	134.7	25 16.1	135.3	24 23.9	135.8	40
30	29 05.9	136.1	28 13.3	136.6	27 20.7	137.1	26 27.8	137.7	25 34.9	138.2	30
20	30 16.6	138.6	29 23.3	139.1	28 29.8	139.6	27 36.3	140.1	26 42.7	140.6	20
10	31 23.8	141.2	30 29.8	141.7	29 35.6	142.2	28 41.4	142.7	27 47.1	143.1	10
2 00	32 27.1	143.8	31 32.4	144.3	30 37.6	144.8	29 42.7	145.3	28 47.6	145.7	2 00
1 50	33 26.7	146.6	32 31.2	147.0	31 35.7	147.5	30 40.1	147.9	29 44.4	148.3	1 50
40	34 22.0	149.4	33 25.9	149.8	32 29.7	150.2	31 33.4	150.6	30 37.0	151.0	40
30	35 12.9	152.2	34 16.2	152.6	33 19.3	153.0	32 22.3	153.3	31 25.3	153.7	30
20	35 59.2	155.1	35 01.8	155.5	34 04.3	155.8	33 06.8	156.2	32 09.3	156.5	20
10	36 40.5	158.1	35 42.6	158.4	34 44.7	158.7	33 46.5	159.0	32 48.5	159.3	10
1 00	37 16.9	161.1	36 18.4	161.4	35 19.9	161.6	34 21.4	161.9	33 22.8	162.2	1 00
0 50	37 48.1	164.2	36 49.1	164.4	35 50.2	164.6	34 51.2	164.8	33 52.2	165.1	0 50
40	38 13.7	167.3	37 14.4	167.5	36 15.1	167.7	35 15.8	167.9	34 16.5	168.1	40
30	38 33.9	170.4	37 34.2	170.6	36 34.7	170.7	35 35.1	170.9	34 35.5	171.0	30
20	38 48.3	173.6	37 48.5	173.7	36 48.7	173.8	35 48.9	173.9	34 49.1	174.0	20
10	38 57.1	176.8	37 57.1	176.8	36 57.2	176.9	35 57.2	176.9	34 57.2	177.0	10
0 00	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 19.6	105.9	0 35.5	106.6							5 10
5 00	2 59.4	107.7	2 15.0	108.4	1 30.5	109.1	0 46.0	109.8	0 01.5	110.4	5 00
4 50	4 38.2	109.5	3 53.3	110.2	3 08.4	110.9	2 23.4	111.6	1 38.4	112.2	4 50
40	6 15.7	111.4	5 30.4	112.1	4 45.1	112.7	3 59.8	113.4	3 14.4	114.1	40
30	7 52.1	113.3	7 06.3	114.0	6 20.5	114.6	5 34.7	115.2	4 48.8	115.9	30
20	9 27.1	115.2	8 40.8	115.9	7 54.5	116.5	7 08.2	117.1	6 21.8	117.8	20
10	11 00.6	117.1	10 13.8	117.8	9 27.1	118.4	8 40.1	119.0	7 53.1	119.7	10
4 00	12 32.5	119.1	11 45.2	119.8	10 57.8	120.4	10 10.4	121.0	9 22.8	121.6	4 00
3 50	14 02.6	121.1	13 14.8	121.8	12 26.9	122.4	11 38.8	123.0	10 50.6	123.6	3 50
40	15 30.9	123.2	14 42.4	123.8	13 53.8	124.4	13 05.2	125.0	12 16.4	125.6	40
30	16 57.1	125.3	16 07.9	125.9	15 18.8	126.4	14 29.5	127.0	13 40.1	127.6	30
20	18 21.1	127.4	17 31.3	128.0	16 41.5	128.5	15 51.5	129.1	15 01.5	129.7	20
10	19 42.7	129.6	18 52.3	130.2	18 01.7	130.7	17 11.1	131.2	16 20.4	131.8	10
3 00	21 01.7	131.8	20 10.6	132.4	19 19.4	132.9	18 28.1	133.4	17 36.7	134.0	3 00
2 50	22 18.1	134.0	21 26.3	134.6	20 34.4	135.1	19 42.3	135.6	18 50.4	136.2	2 50
40	23 31.5	136.3	22 39.1	136.9	21 46.5	137.4	20 53.8	137.9	20 01.1	138.4	40
30	24 41.8	138.7	23 48.7	139.2	22 55.5	139.7	22 02.1	140.2	21 08.7	140.7	30
20	25 48.9	141.1	24 55.0	141.6	24 01.1	142.1	23 07.1	142.6	22 12.9	143.1	20
10	26 52.4	143.6	25 58.0	144.1	25 03.4	144.5	24 08.7	145.0	23 13.9	145.5	10
2 00	27 52.5	146.2	26 57.2	146.6	26 01.9	147.0	25 06.5	147.5	24 11.1	147.9	2 00
1 50	28 48.6	148.7	27 52.7	149.2	26 56.8	149.6	26 00.8	150.0	25 04.7	150.4	1 50
40	29 40.6	151.4	28 44.1	151.8	27 47.5	152.2	26 50.9	152.5	25 54.2	152.9	40
30	30 28.4	154.1	29 31.2	154.4	28 34.1	154.8	27 36.8	155.1	26 39.7	155.5	30
20	31 11.7	156.8	30 14.0	157.1	29 16.3	157.4	28 18.5	157.7	27 20.7	158.1	20
10	31 50.2	159.6	30 52.2	159.9	29 53.9	160.1	28 55.8	160.4	27 57.4	160.7	10
1 00	32 24.2	162.4	31 25.6	162.7	30 26.9	162.9	29 28.2	163.2	28 29.5	163.4	1 00
0 50	32 53.2	165.3	31 54.2	165.5	30 55.1	165.7	29 56.0	165.9	28 56.9	166.1	0 50
40	33 17.1	168.2	32 17.7	168.4	31 18.3	168.5	30 18.9	168.7	29 19.5	168.9	40
30	33 35.8	171.1	32 36.1	171.2	31 36.5	171.3	30 36.9	171.5	29 37.1	171.6	30
20	33 49.2	174.1	32 49.4	174.2	31 49.5	174.2	30 49.7	174.3	29 49.8	174.4	20
10	33 57.3	177.0	32 57.3	177.1	31 57.4	177.1	30 57.4	177.2	29 57.5	177.2	10
0 00	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 53.6	112.9	0 08.7	113.5							4 50
40	2 28.9	114.7	1 43.5	115.4	0 58.1	116.0	0 12.7	116.7			40
30	4 02.9	116.5	3 16.9	117.2	2 31.0	117.8	1 45.0	118.5	0 59.0	119.1	30
20	5 35.3	118.4	4 48.8	119.1	4 02.3	119.7	3 15.8	120.3	2 29.3	120.9	20
10	7 06.1	120.3	6 19.1	120.9	5 32.1	121.5	4 44.9	122.2	3 57.7	122.8	10
4 00	8 35.3	122.2	7 47.6	122.8	6 59.9	123.4	6 12.2	124.1	5 24.4	124.7	4 00
3 50	10 02.4	124.2	9 14.2	124.8	8 25.9	125.4	7 37.6	126.0	6 49.0	126.6	3 50
40	11 27.6	126.2	10 38.7	126.8	9 49.8	127.3	9 00.8	127.9	8 11.7	128.5	40
30	12 50.7	128.2	12 01.1	128.8	11 11.5	129.3	10 21.8	129.9	9 32.1	130.5	30
20	14 11.3	130.3	13 21.1	130.8	12 30.9	131.4	11 40.6	131.9	10 50.2	132.5	20
10	15 29.7	132.4	14 38.8	132.9	13 47.9	133.5	12 56.9	134.0	12 05.8	134.5	10
3 00	16 45.3	134.5	15 53.7	135.0	15 02.1	135.6	14 10.4	136.1	13 18.7	136.6	3 00
2 50	17 58.1	136.7	17 06.0	137.2	16 13.7	137.7	15 21.2	138.2	14 28.9	138.7	2 50
40	19 08.2	138.9	18 15.3	139.4	17 22.3	139.9	16 29.2	140.4	15 36.1	140.9	40
30	20 15.1	141.2	19 21.6	141.7	18 27.9	142.1	17 34.1	142.6	16 40.3	143.1	30
20	21 18.7	143.5	20 24.4	144.0	19 30.1	144.4	18 35.7	144.9	17 41.3	145.3	20
10	22 18.9	145.9	21 24.1	146.3	20 29.1	146.7	19 34.1	147.2	18 38.9	147.6	10
2 00	23 15.6	148.3	22 20.0	148.7	21 24.4	149.1	20 28.7	149.5	19 33.0	149.9	2 00
1 50	24 08.4	150.7	23 12.3	151.1	22 16.1	151.5	21 19.8	151.9	20 23.3	152.2	1 50
40	24 57.4	153.2	24 00.6	153.6	23 03.8	153.9	22 06.9	154.3	21 10.0	154.6	40
30	25 42.2	155.8	24 45.0	156.1	23 47.5	156.4	22 50.1	156.7	21 52.7	157.0	30
20	26 22.9	158.4	25 25.0	158.7	24 27.1	159.0	23 29.2	159.2	22 31.2	159.5	20
10	26 59.0	161.0	26 00.8	161.3	25 02.4	161.5	24 04.0	161.7	23 05.6	162.0	10
1 00	27 30.8	163.6	26 32.0	163.9	25 33.2	164.1	24 34.4	164.3	23 35.6	164.5	1 00
0 50	27 57.8	166.3	26 58.7	166.5	25 59.6	166.7	25 00.4	166.9	24 01.2	167.1	0 50
40	28 20.0	169.0	27 20.6	169.2	26 21.2	169.3	25 21.7	169.5	24 22.3	169.6	40
30	28 37.4	171.7	27 37.9	171.9	26 38.1	172.0	25 38.5	172.1	24 38.7	172.2	30
20	28 50.0	174.5	27 50.1	174.6	26 50.3	174.6	25 50.4	174.7	24 50.6	174.8	20
10	28 57.4	177.2	27 57.6	177.3	26 57.6	177.3	25 57.7	177.4	24 57.7	177.4	10
0 00	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	0 13.0	119.8									4 30
20	1 42.7	121.6	0 56.1	122.2	0 09.4	122.8					20
10	3 10.5	123.4	2 23.3	124.0	1 36.0	124.6	0 48.7	125.3	0 01.6	125.9	10
4 00	4 36.6	125.3	3 48.7	125.9	3 00.8	126.5	2 12.9	127.1	1 24.9	127.7	4 00
3 50	6 00.6	127.2	5 12.2	127.8	4 23.5	128.3	3 35.0	128.9	2 46.4	129.5	3 50
40	7 22.6	129.1	6 33.5	129.7	5 44.2	130.2	4 55.0	130.8	4 05.7	131.4	40
30	8 42.3	131.0	7 52.5	131.6	7 02.6	132.1	6 12.6	132.7	5 22.7	133.3	30
20	9 59.8	133.0	9 09.3	133.6	8 18.7	134.1	7 28.0	134.7	6 37.3	135.2	20
10	11 14.7	135.1	10 23.5	135.6	9 32.1	136.1	8 40.8	136.7	7 49.5	137.2	10
3 00	12 26.9	137.2	11 35.0	137.7	10 43.1	138.2	9 51.1	138.6	8 59.0	139.1	3 00
2 50	13 36.2	139.3	12 43.8	139.7	11 51.1	140.2	10 58.5	140.7	10 05.7	141.2	2 50
40	14 42.9	141.4	13 49.6	141.8	12 56.3	142.3	12 02.9	142.8	11 09.5	143.2	40
30	15 46.5	143.6	14 52.5	144.0	13 58.5	144.4	13 04.5	144.9	12 10.5	145.3	30
20	16 46.8	145.8	15 52.2	146.2	14 57.6	146.6	14 02.9	147.0	13 08.1	147.4	20
10	17 43.7	148.0	16 48.5	148.4	15 53.2	148.8	14 57.9	149.2	14 02.6	149.6	10
2 00	18 37.2	150.3	17 41.3	150.7	16 45.4	151.0	15 49.5	151.4	14 53.5	151.8	2 00
1 50	19 27.0	152.6	18 30.6	153.0	17 34.0	153.3	16 37.6	153.7	15 41.0	154.0	1 50
40	20 13.1	155.0	19 16.1	155.3	18 19.0	155.6	17 21.8	155.9	16 24.7	156.2	40
30	20 55.2	157.4	19 57.7	157.7	19 00.0	157.9	18 02.4	158.2	17 04.7	158.5	30
20	21 33.2	159.8	20 35.2	160.1	19 37.1	160.3	18 39.0	160.6	17 40.9	160.8	20
10	22 07.1	162.2	21 08.7	162.5	20 10.1	162.7	19 11.7	163.0	18 13.2	163.2	10
1 00	22 36.8	164.7	21 37.9	164.9	20 39.0	165.2	19 40.1	165.4	18 41.2	165.6	1 00
0 50	23 02.0	167.2	22 02.8	167.4	21 03.6	167.6	20 04.3	167.8	19 05.1	167.9	0 50
40	23 22.8	169.8	22 23.3	169.9	21 23.8	170.1	20 24.2	170.2	19 24.7	170.3	40
30	23 39.1	172.3	22 39.3	172.4	21 39.6	172.5	20 39.8	172.6	19 40.1	172.7	30
20	23 50.7	174.9	22 50.8	174.9	21 50.9	175.0	20 51.0	175.1	19 51.1	175.1	20
10	23 57.7	177.4	22 57.7	177.4	21 57.7	177.5	20 57.7	177.5	19 57.8	177.6	10
0 00	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 29.5	86.1	1 34.8	85.4	6 10
6 00	0 00.0	90.0	0 43.9	89.3	1 27.7	88.6	2 11.6	88.0	2 55.4	87.2	6 00
5 50	1 42.3	91.8	2 26.2	91.1	3 10.0	90.4	3 53.9	89.8	4 37.8	89.0	5 50
40	3 24.5	93.7	4 08.4	93.0	4 52.2	92.3	5 36.2	91.6	6 19.9	90.9	40
30	5 06.4	95.5	5 50.5	94.8	6 34.4	94.1	7 18.4	93.4	8 02.2	92.7	30
20	6 48.1	97.3	7 32.2	96.7	8 16.3	96.0	9 00.3	95.3	9 44.3	94.6	20
10	8 29.3	99.2	9 13.7	98.5	9 57.9	97.8	10 42.1	97.1	11 26.2	96.5	10
5 00	10 10.0	101.1	10 54.5	100.4	11 39.0	99.7	12 23.4	99.0	13 07.6	98.3	5 00
4 50	11 50.1	103.0	12 34.9	102.3	13 19.4	101.6	14 04.2	100.9	14 48.6	100.2	4 50
40	13 29.4	104.9	14 14.4	104.2	14 59.4	103.5	15 44.2	102.9	16 28.9	102.2	40
30	15 07.7	106.8	15 53.2	106.2	16 38.3	105.5	17 23.6	104.8	18 08.6	104.1	30
20	16 45.1	108.8	17 30.9	108.2	18 16.5	107.5	19 01.9	106.8	19 47.2	106.1	20
10	18 21.3	110.8	19 07.4	110.2	19 53.5	109.5	20 39.4	108.8	21 25.1	108.1	10
4 00	19 56.3	112.9	20 42.8	112.2	21 29.3	111.5	22 15.6	110.9	23 01.7	110.2	4 00
3 50	21 29.8	115.0	22 16.9	114.3	23 03.8	113.6	23 50.5	113.0	24 37.1	112.3	3 50
40	23 01.7	117.1	23 49.2	116.5	24 36.6	115.8	25 23.9	115.1	26 10.9	114.4	40
30	24 31.8	119.3	25 20.0	118.7	26 07.9	118.0	26 55.8	117.3	27 43.3	116.6	30
20	26 00.0	121.5	26 48.8	120.9	27 37.3	120.2	28 25.7	119.6	29 13.8	118.9	20
10	27 26.1	123.8	28 15.6	123.2	29 04.6	122.5	29 53.7	121.9	30 42.5	121.2	10
3 00	28 49.9	126.2	29 39.9	125.6	30 29.7	124.9	31 19.3	124.2	32 08.7	123.6	3 00
2 50	30 11.2	128.6	31 01.9	128.0	31 52.4	127.3	32 42.7	126.7	33 32.8	126.0	2 50
40	31 29.8	131.1	32 21.1	130.5	33 12.4	129.9	34 03.4	129.2	34 54.1	128.6	40
30	32 45.3	133.7	33 37.4	133.1	34 29.3	132.5	35 21.2	131.8	36 12.7	131.2	30
20	33 57.8	136.3	34 50.6	135.7	35 43.3	135.1	36 35.8	134.5	37 28.0	133.9	20
10	35 06.7	139.0	36 00.3	138.4	36 53.8	137.8	37 47.0	137.3	38 40.2	136.7	10
2 00	36 12.1	141.7	37 06.4	141.2	38 00.5	140.6	38 54.5	140.1	39 48.3	139.5	2 00
1 50	37 13.4	144.6	38 08.6	144.1	39 03.3	143.5	39 58.2	143.0	40 52.8	142.5	1 50
40	38 10.6	147.5	39 06.4	147.0	40 02.0	146.5	40 57.5	146.0	41 52.9	145.5	40
30	39 03.3	150.5	39 59.9	150.0	40 56.2	149.6	41 52.5	149.1	42 48.6	148.6	30
20	39 51.4	153.6	40 48.5	153.1	41 45.5	152.7	42 42.5	152.3	43 39.3	151.9	20
10	40 34.4	156.7	41 32.2	156.3	42 29.8	155.9	43 27.5	155.6	44 25.0	155.2	10
1 00	41 12.4	159.9	42 10.6	159.6	43 08.8	159.2	44 07.0	158.9	45 05.1	158.6	1 00
0 50	41 44.8	163.1	42 43.6	162.9	43 42.2	162.6	44 41.1	162.3	45 39.8	162.0	0 50
40	42 11.6	166.4	43 10.8	166.2	44 10.0	166.0	45 09.2	165.8	46 08.3	165.5	40
30	42 32.7	169.8	43 32.2	169.6	44 31.6	169.5	45 31.2	169.3	46 30.8	169.1	30
20	42 47.8	173.2	43 47.6	173.1	44 47.4	173.0	45 47.2	172.8	46 46.9	172.7	20
10	42 56.9	176.6	43 56.8	176.6	44 56.8	176.5	45 56.8	176.4	46 56.8	176.3	10
0 00	43 0.0	180 0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 30					0 02.7	79.7	0 46.9	79.1	1 31.1	78.4	6 30
20	0 15.6	82.9	0 59.6	82.2	1 43.6	81.6	2 27.6	80.9	3 11.6	80.2	20
10	1 57.3	84.7	2 41.2	84.1	3 25.1	83.4	4 08.9	82.7	4 52.7	82.0	10
6 00	3 39.3	86.6	4 23.0	85.9	5 06.9	85.2	5 50.5	84.5	6 34.2	83.8	6 00
5 50	5 21.5	88.4	6 05.2	87.7	6 48.9	87.0	7 32.4	86.3	8 16.1	85.6	5 50
40	7 03.7	90.2	7 47.4	89.6	8 31.1	88.9	9 14.6	88.2	9 58.1	87.4	40
30	8 46.0	92.1	9 29.5	91.4	10 13.4	90.7	10 56.9	90.0	11 40.4	89.3	30
20	10 28.1	93.9	11 12.0	93.2	11 55.7	92.5	12 39.2	91.8	13 22.7	91.1	20
10	12 10.2	95.8	12 54.0	95.1	13 37.8	94.4	14 21.4	93.6	15 05.0	92.9	10
5 00	13 51.7	97.6	14 35.7	96.9	15 19.6	96.2	16 03.4	95.5	16 47.1	94.8	5 00
4 50	15 32.9	99.5	16 17.1	98.8	17 01.2	98.1	17 45.1	97.4	18 28.8	96.7	4 50
40	17 13.5	101.5	17 57.9	100.8	18 42.1	100.0	19 26.2	99.3	20 10.2	98.6	40
30	18 53.3	103.4	19 38.1	102.7	20 22.5	102.0	21 06.8	101.3	21 51.1	100.5	30
20	20 32.4	105.4	21 17.4	104.7	22 02.3	104.0	22 46.9	103.3	23 31.3	102.5	20
10	22 10.6	107.4	22 55.8	106.7	23 41.0	106.0	24 25.9	105.3	25 10.7	104.5	10
4 00	23 47.6	109.5	24 33.3	108.8	25 18.9	108.0	26 04.2	107.3	26 49.3	106.6	4 00
3 50	25 23.4	111.6	26 09.5	110.9	26 55.5	110.1	27 41.2	109.4	28 26.8	108.6	3 50
40	26 57.8	113.7	27 44.5	113.0	28 30.9	112.3	29 17.1	111.6	30 03.1	110.8	40
30	28 30.7	115.9	29 17.8	115.2	30 04.8	114.5	30 51.5	113.8	31 38.1	113.0	30
20	30 01.8	118.2	30 49.6	117.5	31 37.1	116.8	32 24.3	116.0	33 11.3	115.3	20
10	31 31.0	120.5	32 19.3	119.8	33 07.4	119.1	33 55.3	118.4	34 42.9	117.6	10
3 00	32 57.9	122.9	33 47.0	122.2	34 35.8	121.5	35 24.3	120.8	36 12.5	120.1	3 00
2 50	34 22.7	125.4	35 12.3	124.7	36 01.7	124.0	36 51.0	123.3	37 40.0	122.6	2 50
40	35 44.7	127.9	36 35.1	127.2	37 25.3	126.5	38 15.2	125.8	39 04.9	125.1	40
30	37 04.0	130.5	37 55.1	129.9	38 46.0	129.2	39 36.8	128.5	40 27.2	127.8	30
20	38 20.1	133.3	39 12.0	132.6	40 03.7	132.0	40 55.2	131.3	41 46.4	130.6	20
10	39 32.9	136.1	40 25.6	135.4	41 18.1	134.8	42 10.5	134.2	43 02.5	133.5	10
2 00	40 42.1	138.9	41 35.6	138.3	42 28.9	137.7	43 22.0	137.1	44 14.9	136 4	2 00
1 50	41 47.2	141.9	42 41.5	141.3	43 35.7	140.7	44 29.7	140.1	45 23.4	139.5	1 50
40	42 48.2	145.0	43 43.3	144.4	44 38.2	143.9	45 33.0	143.3	46 27.6	142.7	40
30	43 44.6	148.1	44 40.7	147.6	45 36.2	147.1	46 31.8	146.6	47 27.3	146.0	30
20	44 36.0	151.4	45 32.7	150.9	46 29.2	150.4	47 25.6	149.9	48 21.9	149.4	20
10	45 22.3	154.8	46 19.7	154.3	47 17.0	153.9	48 14.1	153.4	49 11.2	153.0	10
1 00	46 03.2	158.2	47 01.1	157.8	47 59.1	157.4	48 56.9	157.0	49 54.8	156.6	1 00
0 50	46 38.3	161.7	47 36.8	161.4	48 35.4	161.1	49 33.8	160.7	50 32.3	160.4	0 50
40	47 07.4	165.3	48 06.5	165.0	49 05.6	164.8	50 04.5	164.5	51 03.5	164.2	40
30	47 30.2	168.9	48 29.8	168.7	49 29.2	168.5	50 28.6	168.3	51 28.1	168.1	30
20	47 46.7	172.6	48 46.5	172.5	49 46.2	172.3	50 46.0	172.2	51 45.7	172.0	20
10	47 56.8	176.3	48 56.6	176.2	49 56.6	176.1	50 56.5	176.1	51 56.5	176.0	10
0 00	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 19.5	69.6	7 00
6 50					0 26.5	72.7	1 11.1	72.1	1 56.0	71.4	6 50
40	0 35.7	75.9	1 20.1	75.2	2 04.5	74.6	2 48.9	73.9	3 33.4	73.2	40
30	2 15.3	77.7	2 59.5	77.0	3 43.7	76.4	4 27.8	75.7	5 11.8	75.0	30
20	3 55.5	79.5	4 39.4	78.8	5 23.4	78.2	6 07.2	77.5	6 51.0	76.8	20
10	5 36.4	81.3	6 20.2	80.6	7 03.9	80.0	7 47.4	79.3	8 31.0	78.6	10
6 00	7 17.8	83.2	8 01.3	82.5	8 44.8	81.8	9 28.2	81.1	10 11.5	80.4	6 00
5 50	8 59.6	85.0	9 42.9	84.3	10 26.3	83.5	11 09.6	82.8	11 52.7	82.1	5 50
40	10 41.6	86.8	11 24.9	86.1	12 08.1	85.3	12 51.2	84.6	13 34.1	83.9	40
30	12 23.7	88.6	13 06.9	87.9	13 50.1	87.1	14 33.1	86.4	15 16.0	85.7	30
20	14 06.0	90.4	14 49.3	89.7	15 32.4	89.0	16 15.3	88.2	16 58.2	87.5	20
10	15 48.4	92.2	16 31.6	91.5	17 14.7	90.8	17 57.7	90.0	18 40.4	89.3	10
5 00	17 30.5	94.1	18 13.8	93.3	18 56.9	92.6	19 39.9	91.9	20 22.7	91.1	5 00
4 50	19 12.4	96.0	19 55.7	95.2	20 39.1	94.5	21 22.1	93.7	22 04.9	93.0	4 50
40	20 53.9	97.9	21 37.5	97.1	22 20.9	96.4	23 04.0	95.6	23 46.9	94.9	40
30	22 35.1	99.8	23 18.7	99.1	24 02.3	98.3	24 45.6	97.5	25 28.8	96.8	30
20	24 15.5	101.8	24 59.5	101.0	25 43.2	100.3	26 26.8	99.5	27 10.1	98.7	20
10	25 55.2	103.8	26 39.5	103.0	27 23.6	102.3	28 07.3	101.5	28 50.9	100.7	10
4 00	27 34.2	105.8	28 18.8	105.1	29 03.2	104.3	29 47.3	103.5	30 31.1	102.7	4 00
3 50	29 12.1	107.9	29 57.2	107.2	30 41.8	106.4	31 26.3	105.6	32 10.5	104.8	3 50
40	30 48.8	110.1	31 34.3	109.3	32 19.5	108.5	33 04.3	107.7	33 48.9	106.9	40
30	32 24.1	112.3	33 10.1	111.5	33 55.8	110.7	34 41.1	109.9	35 26.1	109.1	30
20	33 58.0	114.6	34 44.5	113.8	35 30.7	113.0	36 16.5	112.2	37 02.0	111.4	20
10	35 30.2	116.9	36 17.2	116.1	37 04.1	115.4	37 50.5	114.5	38 36.6	113.7	10
3 00	37 00.5	119.3	37 48.2	118.6	38 35.5	117.8	39 22.6	117.0	40 09.4	116.1	3 00
2 50	38 28.6	121.8	39 16.8	121.1	40 05.0	120.3	40 52.8	119.5	41 40.1	118.6	2 50
40	39 54.3	124.4	40 43.4	123.6	41 32.2	122.9	42 20.7	122.1	43 08.8	121.3	40
30	41 17.3	127.1	42 07.1	126.3	42 56.7	125.6	43 46.0	124.8	44 34.9	124.0	30
20	42 37.4	129.9	43 28.1	129.1	44 18.5	128.4	45 08.6	127.6	45 58.3	126.8	20
10	43 54.3	132.8	44 45.8	132.0	45 37.1	131.3	46 28.0	130.5	47 18.7	129.8	10
2 00	45 07.5	135.7	45 59.9	135.0	46 52.1	134.3	47 44.0	133.6	48 35.5	132.8	2 00
1 50	46 16.9	138.9	47 10.2	138.2	48 03.3	137.5	48 56.1	136.8	49 48.7	136.0	1 50
40	47 22.0	142.1	48 16.2	141.5	49 10.2	140.8	50 03.9	140.1	50 57.4	139.4	40
30	48 22.6	145.4	49 17.6	144.8	50 12.6	144.2	51 07.1	143.6	52 01.8	142.6	30
20	49 18.0	148.9	50 14.0	148.3	51 09.8	147.7	52 05.4	147.1	53 00.8	146.5	20
10	50 08.1	152.5	51 04.9	152.0	52 01.6	151.4	52 58.1	150.9	53 54.4	150.3	10
1 00	50 52.4	156.2	51 50.0	155.7	52 47.4	155.3	53 44.7	154.8	54 41.9	154.2	1 00
0 50	51 30.7	160.0	52 28.8	159.6	53 27.1	159.2	54 25.1	158.7	55 23.1	158.3	0 50
40	52 02.4	163.9	53 01.3	163.5	54 00.1	163.2	54 58.8	162.9	55 57.5	162.5	40
30	52 27.3	167.8	53 26.8	167.6	54 26.1	167.3	55 25.4	167.0	56 24.7	166.7	30
20	52 45.4	171.9	53 45.2	171.7	54 44.8	171.5	55 44.5	171.3	56 44.2	171.1	20
10	52 56.2	175.9	53 56.2	175.8	54 56.2	175.8	55 56.1	175.7	56 56.1	175.6	10
0 00	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20							0 14.3	63.6	1 04.0	62.7	7 20
10			0 15.2	66.5	1 00.8	65.8	1 46.4	65.2	2 32.0	64.5	10
7 00	1 04.6	68.9	1 49.8	68.3	2 34.9	67.6	3 19.9	67.0	4 05.0	66.3	7 00
6 50	2 40.7	70.7	3 25.4	70.1	4 07.4	69.4	4 54.7	68.7	5 39.2	68.1	6 50
40	4 17.8	72.5	5 02.1	71.9	5 46.4	71.2	6 30.6	70.5	7 14.8	69.8	40
30	5 55.8	74.3	6 39.8	73.6	7 23.7	73.0	8 07.4	72.3	8 51.3	71.6	30
20	7 34.7	76.1	8 18.3	75.4	9 01.9	74.7	9 45.4	74.0	10 28.8	73.3	20
10	9 14.4	77.9	9 57.8	77.1	10 41.0	76.4	11 24.2	75.7	12 07.2	75.0	10
6 00	10 54.7	79.7	11 37.8	78.9	12 20.9	78.2	13 03.7	77.5	13 46.5	76.8	6 00
5 50	12 35.7	81.4	13 18.4	80.7	14 01.2	80.0	14 43.8	79.2	15 26.4	78.5	5 50
40	14 17.0	83.2	14 59.7	82.5	15 42.3	81.7	16 24.7	81.0	17 07.0	80.3	40
30	15 58.7	85.0	16 41.2	84.2	17 23.7	83.5	18 05.9	82.7	18 48.0	82.0	30
20	17 40.8	86.8	18 23.2	86.0	19 05.5	85.3	19 47.6	84.5	20 29.6	83.7	20
10	19 23.0	88.6	20 05.4	87.8	20 47.5	87.1	21 29.7	86.3	22 11.3	85.5	10
5 00	21 05.3	90.4	21 47.7	89.6	22 29.9	88.9	23 11.8	88.1	23 53.5	87.3	5 00
4 50	22 47.5	92.2	23 29.9	91.4	24 12.0	90.7	24 54.0	89.9	25 35.7	89.1	4 50
40	24 29.6	94.1	25 12.1	93.3	25 54.3	92.5	26 36.3	91.7	27 18.0	90.9	40
30	26 11.5	96.0	26 54.1	95.2	27 36.5	94.4	28 18.4	93.6	29 00.2	92.8	30
20	27 53.1	97.9	28 35.8	97.1	29 18.3	96.3	30 00.5	95.5	30 42.4	94.7	20
10	29 34.1	99.9	30 17.0	99.1	30 59.8	98.3	31 42.1	97.5	32 24.1	96.6	10
4 00	31 14.7	101.9	31 57.9	101.1	32 40.7	100.3	33 23.3	99.5	34 05.6	98.6	4 00
3 50	32 54.2	104.0	33 37.8	103.2	34 21.0	102.3	35 04.0	101.5	35 46.4	100.6	3 50
40	34 33.1	106.1	35 17.0	105.3	36 00.6	104.4	36 43.7	103.6	37 26.6	102.7	40
30	36 10.7	108.3	36 55.1	107.5	37 39.0	106.5	38 22.7	105.7	39 05.8	104.8	30
20	37 47.3	110.6	38 32.1	109.7	39 16.5	108.8	40 00.6	108.0	40 44.3	107.1	20
10	39 22.2	112.9	40 07.7	112.1	40 52.8	111.2	41 37.2	110.3	42 21.4	109.4	10
3 00	40 55.7	115.3	41 41.7	114.5	42 27.3	113.6	43 12.5	112.7	43 57.3	111.8	3 00
2 50	42 27.1	117.8	43 13.8	117.0	44 00.1	116.1	44 45.9	115.2	45 31.3	114.3	2 50
40	43 56.6	120.5	44 44.0	119.6	45 31.0	118.7	46 17.5	117.8	47 03.7	116.9	40
30	45 23.5	123.2	46 11.7	122.3	46 59.4	121.4	47 46.9	120.5	48 33.9	119.6	30
20	46 47.7	126.0	47 36.7	125.1	48 25.4	124.2	49 13.7	123.3	50 01.5	122.4	20
10	48 08.9	129.0	48 58.8	128.1	49 48.4	127.2	50 37.7	126.3	51 26.4	125.4	10
2 00	49 26.9	132.0	50 17.7	131.2	51 08.2	130.4	51 58.4	129.5	52 48.2	128.6	2 00
1 50	50 40.8	135.3	51 32.6	134.5	52 24.1	133.7	53 15.5	132.8	54 06.2	131.9	1 50
40	51 50.7	138.6	52 43.5	137.9	53 36.2	137.1	54 28.5	136.2	55 20.4	135.3	40
30	52 55.8	142.2	53 49.7	141.5	54 43.5	140.7	55 36.8	139.9	56 29.7	139.1	30
20	53 56.0	145.9	54 51.0	145.2	55 45.7	144.5	56 40.1	143.7	57 34.3	142.9	20
10	54 50.5	149.7	55 46.4	149.1	56 42.1	148.4	57 37.9	147.7	58 33.0	147.0	10
1 00	55 39.1	153.7	56 35.9	153.1	57 32.7	152.5	58 29.2	151.9	59 25.6	151.2	1 00
0 50	56 20.9	157.8	57 18.8	157.3	58 16.4	156.8	59 14.0	156.3	60 11.2	155.7	0 50
40	56 56.1	162.1	57 54.6	161.7	58 53.0	161.3	59 51.4	160.8	60 49.6	160.3	40
30	57 23.7	166.4	58 22.8	166.1	59 22.0	165.8	60 21.0	165.5	61 20.0	165.1	30
20	57 43.8	170.9	58 43.5	170.7	59 43.0	170.5	60 42.6	170.3	61 42.2	170.0	20
10	57 55.9	175.5	58 55.8	175.4	59 55.8	175.2	60 55.7	175.1	61 55.4	175.0	10
0 00	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 50									0 33.7	54.1	7 50
40					0 23.1	57.2	1 10.3	56.6	1 57.5	55.9	40
30	0 16.7	60.3	1 03.4	59.6	1 49.9	59.0	2 36.6	58.4	3 23.1	57.7	30
20	1 46.4	62.1	2 32.4	61.4	3 18.5	60.8	4 05.5	60.2	4 50.5	59.5	20
10	3 17.5	63.8	4 03.1	63.2	4 48.5	62.5	5 33.9	61.9	6 19.3	61.2	10
7 00	4 50.0	65.6	5 35.1	65.0	6 20.0	64.3	7 05.0	63.6	7 49.7	63.0	7 00
6 50	6 23.8	67.4	7 08.4	66.7	7 52.7	66.0	8 37.2	65.4	9 21.6	64.7	6 50
40	7 58.8	69.2	8 42.9	68.5	9 26.9	67.8	10 10.8	67.1	10 54.7	66.4	40
30	9 35.0	70.9	10 18.7	70.2	11 02.2	69.5	11 45.6	68.8	12 29.0	68.1	30
20	11 12.2	72.6	11 55.4	71.9	12 38.6	71.2	13 21.6	70.5	14 04.5	69.8	20
10	12 50.2	74.3	13 33.2	73.6	14 15.8	72.9	14 58.4	72.2	15 40.9	71.4	10
6 00	14 29.1	76.1	15 11.6	75.3	15 54.0	74.6	16 36.3	73.9	17 18.3	73.1	6 00
5 50	16 08.7	77.8	16 51.1	77.1	17 33.0	76.3	18 14.9	75.5	18 56.7	74.8	5 50
40	17 49.1	79.5	18 31.0	78.8	19 12.8	78.0	19 54.4	77.2	20 35.7	76.5	40
30	19 29.9	81.2	20 11.7	80.5	20 53.1	79.7	21 34.4	78.9	22 15.5	78.1	30
20	21 11.3	83.0	21 52.8	82.2	22 34.0	81.4	23 15.1	80.6	23 55.9	79.8	20
10	22 52.9	84.7	23 34.4	83.9	24 15.1	83.1	24 56.2	82.3	25 36.9	81.5	10
5 00	24 34.9	86.5	25 16.2	85.7	25 57.2	84.9	26 37.8	84.1	27 18.2	83.3	5 00
4 50	26 17.1	88.3	26 58.3	87.5	27 39.1	86.7	28 19.7	85.8	29 00.1	85.0	4 50
40	27 59.5	90.1	28 40.6	89.3	29 21.4	88.5	30 02.0	87.6	30 42.1	86.8	40
30	29 41.7	91.9	30 22.9	91.1	31 03.6	90.3	31 44.2	89.4	32 24.3	88.6	30
20	31 23.9	93.8	32 05.1	93.0	32 46.0	92.1	33 26.5	91.3	34 06.6	90.4	20
10	33 05.8	95.7	33 47.2	94.9	34 28.1	94.0	35 08.7	93.1	35 48.8	92.2	10
4 00	34 47.4	97.7	35 28.9	96.8	36 10.0	95.9	36 50.7	95.0	37 30.9	94.1	4 00
3 50	36 28.4	99.7	37 10.2	98.8	37 51.5	97.9	38 32.4	97.0	39 12.8	96.1	3 50
40	38 09.0	101.8	38 51.0	100.9	39 32.6	100.0	40 13.8	99.0	40 54.4	98.1	40
30	39 48.7	103.9	40 31.2	103.0	41 13.0	102.1	41 54.5	101.1	42 35.4	100.2	30
20	41 27.5	106.1	42 10.3	105.2	42 52.6	104.3	43 34.5	103.3	44 15.7	102.3	20
10	43 05.2	108.5	43 48.5	107.5	44 31.2	106.5	45 13.6	105.5	45 55.4	104.5	10
3 00	44 41.6	110.9	45 25.4	109.9	46 08.7	108.9	46 51.6	107.8	47 33.8	106.8	3 00
2 50	46 16.4	113.3	47 00.8	112.3	47 44.7	111.3	48 28.2	110.3	49 11.0	109.3	2 50
40	47 49.4	115.9	48 34.5	114.9	49 19.2	113.9	50 03.4	112.9	50 46.9	111.8	40
30	49 20.2	118.6	50 06.3	117.6	50 51.7	116.6	51 36.6	115.6	52 20.9	114.5	30
20	50 48.9	121.4	51 35.7	120.4	52 22.1	119.4	53 07.9	118.4	53 53.1	117.3	20
10	52 14.7	124.4	53 02.5	123.4	53 49.7	122.4	54 36.5	121.4	55 22.7	120.3	10
2 00	53 37.4	127.6	54 26.3	126.6	55 14.7	125.6	56 02.5	124.5	56 49.7	123.4	2 00
1 50	54 56.7	130.9	55 46.6	129.9	56 36.1	128.9	57 25.1	127.9	58 13.4	126.8	1 50
40	56 11.9	134.4	57 02.9	133.5	57 53.6	132.5	58 43.8	131.5	59 33.3	130.4	40
30	57 22.5	138.2	58 14.7	137.3	59 06.6	136.3	59 58.1	135.3	60 49.1	134.3	30
20	58 28.1	142.1	59 21.6	141.2	60 14.8	140.3	61 07.6	139.3	61 59.9	138.3	20
10	59 28.0	146.2	60 22.9	145.4	61 17.2	144.6	62 11.2	143.7	63 05.0	142.7	10
1 00	60 21.7	150.5	61 17.6	149.8	62 13.3	149.0	63 08.7	148.2	64 03.7	147.3	1 00
0 50	61 08.4	155.1	62 05.5	154.5	63 02.4	153.8	63 59.0	153.1	64 55.4	152.3	0 50
40	61 47.8	159.8	62 45.7	159.3	63 43.7	158.7	64 41.4	158.1	65 38.9	157.4	40
30	62 19.0	164.7	63 17.9	164.3	64 16.5	163.8	65 15.1	163.3	66 13.9	162.8	30
20	62 41.6	169.7	63 41.1	169.4	64 40.5	169.1	65 39.9	168.7	66 39.2	168.4	20
10	62 55.4	174.8	63 55.4	174.7	64 55.0	174.5	65 54.9	174.4	66 54.7	174.2	10
0 00	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	1 42. 3	91. 8	0 58. 4	92. 5	0 14. 6	93. 2					5 50
40	3 24. 5	93. 7	2 40. 5	94. 3	1 56. 5	95. 0	1 12. 4	95. 7	0 28. 4	96. 4	40
30	5 06. 4	95. 5	4 22. 4	96. 2	3 38. 2	96. 8	2 54. 1	97. 5	2 09. 9	98. 2	30
20	6 48. 1	97. 3	6 03. 9	98. 0	5 19. 6	98. 7	4 35. 2	99. 4	3 50. 8	100. 1	20
10	8 29. 3	99. 2	7 44. 9	99. 9	7 00. 4	100. 6	6 15. 9	101. 2	5 31. 4	101. 9	10
5 00	10 10. 0	101. 1	9 25. 4	101. 8	8 40. 7	102. 5	7 55. 9	103. 1	7 11. 1	103. 8	5 00
4 50	11 50. 1	103. 0	11 05. 2	103. 7	10 20. 2	104. 4	9 35. 2	105. 0	8 50. 1	105. 7	4 50
40	13 29. 4	104. 9	12 44. 2	105. 6	11 58. 9	106. 3	11 13. 4	106. 9	10 27. 9	107. 6	40
30	15 07. 7	106. 8	14 22. 2	107. 5	13 36. 6	108. 2	12 50. 9	108. 8	12 05. 1	109. 5	30
20	16 45. 1	108. 8	15 59. 2	109. 5	15 13. 2	110. 2	14 27. 1	110. 8	13 40. 8	111. 5	20
10	18 21. 3	110. 8	17 35. 0	111. 5	16 48. 6	112. 2	16 02. 0	112. 8	15 15. 4	113. 5	10
4 00	19 56. 3	112. 9	19 09. 5	113. 6	18 22. 6	114. 2	17 35. 5	114. 9	16 48. 4	115. 5	4 00
3 50	21 29. 8	115. 0	20 42. 6	115. 7	19 55. 2	116. 3	19 07. 6	117. 0	18 20. 0	117. 6	3 50
40	23 01. 7	117. 1	22 13. 9	117. 8	21 26. 0	118. 4	20 37. 9	119. 1	19 49. 7	119. 7	40
30	24 31. 8	119. 3	23 43. 6	120. 0	22 55. 0	120. 6	22 06. 4	121. 3	21 17. 6	121. 9	30
20	26 00. 0	121. 5	25 11. 0	122. 2	24 22. 0	122. 8	23 32. 8	123. 5	22 43. 4	124. 1	20
10	27 26. 1	123. 8	26 36. 7	124. 5	25 46. 9	125. 1	24 57. 1	125. 7	24 07. 1	126. 3	10
3 00	28 49. 9	126. 2	27 59. 8	126. 8	27 09. 4	127. 4	26 18. 9	128. 0	25 28. 2	128. 6	3 00
2 50	30 11. 2	128. 6	29 20. 4	129. 2	28 29. 4	129. 8	27 38. 1	130. 4	26 46. 8	131. 0	2 50
40	31 29. 8	131. 1	30 38. 2	131. 7	29 46. 5	132. 3	28 54. 7	132. 8	28 02. 6	133. 4	40
30	32 45. 3	133. 7	31 53. 1	134. 2	31 00. 7	134. 8	30 08. 1	135. 3	29 15. 4	135. 9	30
20	33 57. 8	136. 3	33 04. 8	136. 8	32 11. 7	137. 4	31 18. 4	137. 9	30 25. 0	138. 4	20
10	35 06. 7	139. 0	34 12. 8	139. 5	33 19. 2	140. 0	32 25. 2	140. 5	31 31. 2	141. 0	10
2 00	36 12. 1	141. 7	35 17. 7	142. 2	34 23. 0	142. 7	33 28. 3	143. 2	32 33. 5	143. 7	2 00
1 50	37 13. 4	144. 6	36 18. 3	145. 1	35 23. 0	145. 5	34 27. 6	146. 0	33 32. 1	146. 5	1 50
40	38 10. 6	147. 5	37 14. 8	147. 9	36 18. 8	148. 4	35 22. 7	148. 8	34 26. 5	149. 3	40
30	39 03. 3	150. 5	38 06. 9	150. 9	37 10. 2	151. 3	36 13. 4	151. 7	35 16. 6	152. 1	30
20	39 51. 4	153. 6	38 54. 2	153. 9	37 56. 9	154. 3	36 59. 5	154. 7	36 02. 2	155. 0	20
10	40 34. 4	156. 7	39 36. 7	157. 0	38 38. 8	157. 4	37 40. 8	157. 7	36 42. 9	158. 0	10
1 00	41 12. 4	159. 9	40 14. 0	160. 2	39 15. 5	160. 5	38 17. 1	160. 8	37 18. 6	161. 1	1 00
0 50	41 44. 8	163. 1	40 46. 0	163. 4	39 47. 1	163. 7	38 48. 2	163. 9	37 49. 2	164. 1	0 50
40	42 11. 6	166. 4	41 12. 4	166. 7	40 13. 1	166. 9	39 13. 8	167. 1	38 14. 5	167. 3	40
30	42 32. 7	169. 8	41 33. 1	170. 0	40 33. 5	170. 1	39 33. 8	170. 3	38 34. 3	170. 4	30
20	42 47. 8	173. 2	41 48. 0	173. 3	40 48. 2	173. 4	39 48. 3	173. 5	38 48. 5	173. 6	20
10	42 56. 9	176. 6	41 57. 0	176. 6	40 57. 0	176. 7	39 57. 0	176. 7	38 57. 2	176. 8	10
0 00	43 0. 0	180. 0	42 0. 0	180. 0	41 0. 0	180. 0	40 0. 0	180. 0	39 0. 0	180. 0	0 00

In North declination when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 25.8	98.9	0 41.6	99.6							5 30
20	3 06.5	100.7	2 22.1	101.4	1 37.7	102.1	0 53.3	102.8	0 08.8	103.4	20
10	4 46.8	102.6	4 02.2	103.2	3 17.4	103.9	2 32.7	104.6	1 47.9	105.2	10
5 00	6 26.2	104.5	5 41.3	105.1	4 56.3	105.8	4 11.2	106.5	3 26.2	107.1	5 00
4 50	8 04.8	106.4	7 19.6	107.0	6 34.2	107.7	5 48.9	108.3	5 03.5	108.9	4 50
40	9 42.4	108.3	8 56.8	108.9	8 11.2	109.6	7 25.4	110.2	6 39.6	110.9	40
30	11 19.1	110.2	10 33.2	110.8	9 46.9	111.5	9 00.8	112.1	8 14.6	112.8	30
20	12 54.5	112.1	12 08.1	112.8	11 21.5	113.4	10 34.9	114.1	9 48.2	114.7	20
10	14 28.6	114.1	13 41.7	114.8	12 54.6	115.4	12 07.6	116.1	11 20.4	116.7	10
4 00	16 01.2	116.1	15 13.8	116.8	14 26.3	117.4	13 38.7	118.1	12 51.1	118.7	4 00
3 50	17 32.1	118.2	16 44.2	118.9	15 56.2	119.5	15 08.1	120.1	14 19.9	120.7	3 50
40	19 01.4	120.3	18 12.9	121.0	17 24.3	121.6	16 35.6	122.2	15 46.8	122.8	40
30	20 28.8	122.5	19 39.7	123.1	18 50.4	123.7	18 01.2	124.3	17 11.9	124.9	30
20	21 53.9	124.7	21 04.2	125.3	20 14.5	125.9	19 24.6	126.5	18 34.6	127.0	20
10	23 16.9	126.9	22 26.8	127.5	21 36.2	128.1	20 45.8	128.7	19 55.1	129.2	10
3 00	24 37.4	129.2	23 46.5	129.8	22 55.5	130.4	22 04.3	130.9	21 13.1	131.5	3 00
2 50	25 55.4	131.6	25 03.9	132.1	24 12.1	132.7	23 20.3	133.2	22 28.4	133.8	2 50
40	27 10.5	134.0	26 18.2	134.5	25 25.8	135.1	24 33.3	135.6	23 40.7	136.1	40
30	28 22.6	136.4	27 29.7	137.0	26 36.5	137.5	25 43.4	138.0	24 50.1	138.5	30
20	29 31.4	138.9	28 37.8	139.5	27 44.0	140.0	26 50.2	140.5	25 56.2	141.0	20
10	30 36.9	141.5	29 42.6	142.1	28 48.1	142.5	27 53.6	143.0	26 58.9	143.5	10
2 00	31 38.6	144.2	30 43.6	144.7	29 48.5	145.1	28 53.3	145.6	27 58.0	146.0	2 00
1 50	32 36.5	146.9	31 40.8	147.3	30 45.0	147.7	29 49.2	148.2	28 53.2	148.6	1 50
40	33 30.2	149.7	32 33.9	150.1	31 37.5	150.5	30 41.0	150.9	29 44.5	151.3	40
30	34 19.8	152.5	33 22.8	152.9	32 25.7	153.3	31 28.7	153.6	30 31.5	154.0	30
20	35 04.7	155.4	34 07.1	155.8	33 09.5	156.1	32 11.9	156.4	31 14.2	156.7	20
10	35 44.8	158.3	34 46.8	158.6	33 48.7	158.9	32 50.5	159.2	31 52.3	159.5	10
1 00	36 20.1	161.3	35 21.5	161.6	34 22.9	161.9	33 24.3	162.1	32 25.7	162.4	1 00
0 50	36 50.3	164.3	35 51.3	164.6	34 52.3	164.8	33 53.2	165.0	32 54.2	165.2	0 50
40	37 15.1	167.4	36 15.8	167.6	35 16.5	167.8	34 17.1	168.0	33 17.8	168.2	40
30	37 34.7	170.5	36 35.1	170.7	35 35.5	170.9	34 35.8	171.0	33 36.2	170.1	30
20	37 48.7	173.7	36 48.9	173.8	35 49.1	173.9	34 49.3	174.0	33 49.4	174.1	20
10	37 57.2	176.8	36 57.2	176.9	35 57.2	176.9	34 57.3	177.0	33 57.4	177.0	10
0 00	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	1 03.2	105.9	0 18.4	106.6							5 10
5 00	2 41.1	107.8	1 56.0	108.4	1 10.9	109.1	0 25.7	109.8			5 00
4 50	4 18.0	109.6	3 32.5	110.3	2 47.0	110.9	2 01.4	111.6	1 15.8	112.2	4 50
40	5 53.8	111.5	5 07.8	112.2	4 21.9	112.8	3 35.9	113.5	2 49.9	114.1	40
30	7 28.3	113.4	6 41.9	114.1	5 55.5	114.7	5 09.1	115.3	4 22.7	116.0	30
20	9 01.5	115.4	8 14.6	116.0	7 27.7	116.6	6 40.8	117.2	5 53.8	117.9	20
10	10 33.1	117.3	9 45.8	117.9	8 58.4	118.5	8 10.9	119.1	7 23.4	119.8	10
4 00	12 03.2	119.3	11 15.4	119.9	10 27.4	120.5	9 39.5	121.1	8 51.4	121.8	4 00
3 50	13 31.4	121.3	12 43.2	121.9	11 54.6	122.5	11 06.1	123.1	10 17.4	123.8	3 50
40	14 58.0	123.4	14 09.0	124.0	13 19.9	124.6	12 30.7	125.2	11 41.5	125.8	40
30	16 22.3	125.5	15 32.7	126.1	14 43.1	126.7	13 53.2	127.2	13 03.4	127.8	30
20	17 44.5	127.6	16 54.3	128.2	16 04.0	128.8	15 13.6	129.3	14 23.1	129.9	20
10	19 04.3	129.8	18 13.5	130.4	17 22.6	130.9	16 31.5	131.5	15 40.3	132.0	10
3 00	20 21.6	132.1	19 30.1	132.6	18 38.5	133.1	17 46.8	133.7	16 55.0	134.2	3 00
2 50	21 36.2	134.3	20 44.0	134.8	19 51.8	135.3	18 59.4	135.9	18 06.9	136.4	2 50
40	22 48.0	136.6	21 55.2	137.2	21 02.2	137.7	20 09.2	138.2	19 16.1	138.6	40
30	23 56.6	139.0	23 03.1	139.5	22 09.5	140.0	21 15.9	140.5	20 22.1	140.9	30
20	25 02.1	141.4	24 07.9	141.9	23 13.7	142.4	22 19.4	142.8	21 24.9	143.3	20
10	26 04.2	143.9	25 09.4	144.4	24 14.5	144.8	23 19.5	145.2	22 24.3	145.7	10
2 00	27 02.6	146.4	26 07.1	146.9	25 11.5	147.3	24 15.9	147.7	23 20.3	148.1	2 00
1 50	27 57.2	149.0	27 01.2	149.4	26 04.9	149.8	25 08.8	150.2	24 12.4	150.6	1 50
40	28 47.9	151.6	27 51.2	152.0	26 54.4	152.4	25 57.6	152.8	25 00.8	153.1	40
30	29 34.3	154.3	28 37.1	154.7	27 39.8	155.0	26 42.4	155.4	25 45.0	155.7	30
20	30 16.5	157.1	29 18.7	157.4	28 20.9	157.7	27 22.9	158.0	26 25.0	158.3	20
10	30 54.1	159.8	29 55.8	160.1	28 57.5	160.4	27 59.1	160.6	27 00.8	160.9	10
1 00	31 27.0	162.6	30 28.3	162.9	29 29.6	163.1	28 30.8	163.3	27 32.0	163.6	1 00
0 50	31 55.2	165.4	30 56.0	165.7	29 57.0	165.9	28 57.8	166.1	27 58.7	166.3	0 50
40	32 18.4	168.3	31 18.9	168.5	30 19.5	168.7	29 20.1	168.8	28 20.7	169.0	40
30	32 36.4	171.2	31 36.8	171.4	30 37.2	171.5	29 37.5	171.6	28 37.8	171.7	30
20	32 49.6	174.1	31 49.7	174.2	30 49.8	174.3	29 50.0	174.4	28 50.1	174.5	20
10	32 57.4	177.0	31 57.4	177.1	30 57.5	177.1	29 57.5	177.2	28 57.5	177.2	10
0 00	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 30.3	112.9									4 50
40	2 03.8	114.7	1 17.8	115.4	0 31.8	116.0					40
30	3 36.1	116.6	2 49.6	117.2	2 03.0	117.8	1 16.3	118.5	0 29.8	119.1	30
20	5 06.8	118.5	4 19.7	119.1	3 32.6	119.7	2 45.5	120.4	1 58.4	121.0	20
10	6 35.9	120.4	5 48.2	121.0	5 00.7	121.6	4 12.9	122.3	3 25.2	122.9	10
4 00	8 03.3	122.4	7 15.1	123.0	6 26.8	123.6	5 38.6	124.2	4 50.2	124.8	4 00
3 50	9 28.8	124.3	8 39.9	124.9	7 51.1	125.5	7 02.2	126.1	6 13.3	126.7	3 50
40	10 52.2	126.3	10 02.8	126.9	9 13.4	127.5	8 23.9	128.1	7 34.3	128.6	40
30	12 13.4	128.3	11 23.5	128.9	10 33.4	129.5	9 43.2	130.1	8 53.1	130.6	30
20	13 32.5	130.4	12 41.9	131.0	11 51.2	131.5	11 00.5	132.1	10 09.6	132.6	20
10	14 49.1	132.5	13 57.9	133.1	13 06.6	133.6	12 15.1	134.2	11 23.6	134.7	10
3 00	16 03.2	134.7	15 11.2	135.2	14 19.2	135.7	13 27.2	136.3	12 35.1	136.8	3 00
2 50	17 14.6	136.9	16 22.0	137.4	15 29.3	137.9	14 36.4	138.4	13 43.7	138.9	2 50
40	18 22.9	139.1	17 29.7	139.6	16 36.4	140.1	15 43.0	140.6	14 49.5	141.0	40
30	19 28.4	141.4	18 34.5	141.9	17 40.4	142.3	16 46.4	142.8	15 52.4	143.2	30
20	20 30.4	143.7	19 35.8	144.2	18 41.3	144.6	17 46.6	145.1	16 51.9	145.5	20
10	21 29.3	146.1	20 34.1	146.5	19 38.8	146.9	18 43.6	147.4	17 48.2	147.8	10
2 00	22 24.6	148.5	21 28.8	148.9	20 32.9	149.3	19 37.0	149.7	18 41.1	150.1	2 00
1 50	23 16.1	151.0	22 19.8	151.3	21 23.2	151.7	20 26.8	152.1	19 30.2	152.4	1 50
40	24 03.9	153.5	23 06.9	153.8	22 09.9	154.1	21 12.8	154.5	20 15.8	154.8	40
30	24 47.6	156.0	23 50.0	156.3	22 52.6	156.6	21 54.9	156.9	20 57.3	157.2	30
20	25 27.1	158.5	24 29.1	158.8	23 31.1	159.1	22 33.1	159.4	21 35.0	159.7	20
10	26 02.4	161.1	25 03.9	161.4	24 05.5	161.6	23 07.1	161.9	22 08.5	162.1	10
1 00	26 33.2	163.8	25 34.4	164.0	24 35.5	164.2	23 36.6	164.4	22 37.8	164.6	1 00
0 50	26 59.5	166.4	26 00.3	166.6	25 01.1	166.8	24 02.0	167.0	23 02.7	167.2	0 50
40	27 21.2	169.1	26 21.7	169.3	25 22.3	169.4	24 22.7	169.6	23 23.3	169.7	40
30	27 38.1	171.8	26 38.4	171.9	25 38.8	172.0	24 38.9	172.2	23 39.2	172.3	30
20	27 50.3	174.5	26 50.4	174.6	25 50.6	174.7	24 50.7	174.8	23 50.9	174.9	20
10	27 57.7	177.2	26 57.7	177.3	25 57.7	177.3	24 57.7	177.4	23 57.7	177.4	10
0 00	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 20	1 11.3	121.6	0 24.1	122.2							4 20
10	2 37.5	123.5	1 49.7	124.1	1 01.9	124.7	0 14.2	125.3			10
4 00	4 01.9	125.4	3 13.5	125.9	2 25.1	126.5	1 36.7	127.1	0 48.3	127.7	4 00
3 50	5 24.3	127.3	4 35.3	127.8	3 46.3	128.4	2 57.2	129.0	2 08.2	129.5	3 50
40	6 44.7	129.2	5 55.1	129.7	5 05.4	130.3	4 15.8	130.9	3 26.0	131.4	40
30	8 02.9	131.2	7 12.6	131.7	6 22.2	132.2	5 32.0	132.8	4 41.5	133.3	30
20	9 18.7	133.2	8 27.8	133.7	7 36.8	134.2	6 45.8	134.8	5 54.7	135.3	20
10	10 32.1	135.2	9 40.4	135.7	8 48.8	136.2	7 57.2	136.8	7 05.5	137.3	10
3 00	11 42.9	137.3	10 50.6	137.8	9 58.3	138.3	9 06.0	138.8	8 13.6	139.2	3 00
2 50	12 50.9	139.4	11 57.9	139.9	11 04.9	140.4	10 12.0	140.8	9 18.8	141.3	2 50
40	13 56.0	141.5	13 02.5	142.0	12 08.8	142.5	11 15.2	142.9	10 21.5	143.4	40
30	14 58.2	143.7	14 03.9	144.1	13 09.7	144.6	12 15.4	145.0	11 21.0	145.5	30
20	15 57.2	145.9	15 02.3	146.3	14 07.4	146.8	13 12.5	147.2	12 17.5	147.6	20
10	16 52.8	148.2	15 57.3	138.6	15 01.7	149.0	14 06.3	149.4	13 10.7	149.7	10
2 00	17 45.1	150.5	16 49.0	150.8	15 52.9	151.2	14 56.8	151.9	14 00.6	151.9	2 00
1 50	18 33.7	152.8	17 37.1	153.1	16 40.4	153.5	15 43.7	153.8	14 47.0	154.1	1 50
40	19 18.7	155.1	18 21.5	155.4	17 24.3	155.8	16 27.0	156.1	15 29.8	156.4	40
30	19 59.7	157.5	19 02.0	157.8	18 04.4	158.1	17 06.7	158.4	16 08.9	158.6	30
20	20 36.9	159.9	19 38.8	160.2	18 40.6	160.4	17 42.5	160.7	16 44.3	160.9	20
10	21 10.0	162.3	20 11.4	162.6	19 12.8	162.8	18 14.2	163.1	17 15.7	163.3	10
1 00	21 38.9	164.8	20 39.9	165.0	19 41.0	165.2	18 42.1	165.4	17 43.1	165.6	1 00
0 50	22 03.4	167.3	21 04.2	167.5	20 05.0	167.6	19 05.7	167.8	18 06.4	168.0	0 50
40	22 23.7	169.8	21 24.2	170.0	20 24.7	170.1	19 25.1	170.2	18 25.6	170.4	40
30	22 39.6	172.3	21 39.8	172.4	20 40.0	172.5	19 40.3	172.6	18 40.6	172.8	30
20	22 51.0	174.9	21 51.1	175.0	20 51.2	175.0	19 51.3	175.1	18 51.4	175.2	20
10	22 57.8	177.4	21 57.7	177.5	20 57.7	177.5	19 57.8	177.5	18 57.8	177.6	10
0 00	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 33.5	86.1	1 18.1	85.5	6 10
6 00	0 00.0	90.0	0 44.6	89.3	1 29.2	83.7	2 13.7	88.0	2 58.3	87.3	6 00
5 50	1 40.4	91.8	2 25.0	91.2	3 09.5	90.5	3 54.1	89.8	4 38.6	89.1	5 50
40	3 20.6	93.7	4 05.2	93.1	4 49.8	92.4	5 34.4	91.7	6 18.9	91.0	40
30	5 00.7	95.6	5 45.4	94.9	6 30.1	94.2	7 14.7	93.6	7 59.3	92.9	30
20	6 40.3	97.5	7 25.2	96.8	8 10.0	96.1	8 54.7	95.5	9 39.4	94.8	20
10	8 19.7	99.4	9 04.7	98.7	9 49.6	98.0	10 34.6	97.4	11 19.3	96.7	10
5 00	9 58.4	101.3	10 43.6	100.6	11 28.8	99.9	12 13.9	99.3	12 58.8	98.6	5 00
4 50	11 36.5	103.2	12 22.0	102.5	13 07.3	101.8	13 52.6	101.2	14 37.8	100.5	4 50
40	13 13.8	105.1	13 59.6	104.5	14 45.2	103.8	15 30.7	103.1	16 16.1	102.5	40
30	14 50.2	107.1	15 36.3	106.5	16 22.2	105.8	17 07.9	105.1	17 53.8	104.4	30
20	16 25.6	109.1	17 12.0	108.5	17 58.3	107.8	18 44.4	107.1	19 30.4	106.4	20
10	17 59.8	111.1	18 46.6	110.5	19 33.3	109.8	20 19.8	109.1	21 06.2	108.5	10
4 00	19 32.8	113.2	20 20.0	112.6	21 07.1	111.9	21 54.1	111.2	22 40.8	110.6	4 00
3 50	21 04.3	115.3	21 52.0	114.6	22 39.5	114.0	23 27.0	113.4	24 14.1	112.7	3 50
40	22 34.1	117.5	23 22.3	116.8	24 10.3	116.2	24 58.2	115.5	25 45.9	114.9	40
30	24 02.3	119.7	24 51.0	119.1	25 39.6	118.4	26 28.0	117.7	27 16.2	117.1	30
20	25 28.5	121.9	26 17.8	121.3	27 06.9	120.7	27 55.9	120.0	28 44.6	119.4	20
10	26 52.5	124.2	27 42.5	123.6	28 32.2	123.0	29 21.8	122.4	30 11.1	121.7	10
3 00	28 14.4	126.6	29 04.9	126.0	29 55.2	125.4	30 45.4	124.8	31 35.3	124.1	3 00
2 50	29 33.6	129.0	30 24.8	128.4	31 15.8	127.8	32 06.7	127.2	32 57.3	126.6	2 50
40	30 50.2	131.5	31 42.0	130.9	32 33.7	130.4	33 25.2	129.7	34 16.5	129.1	40
30	32 03.8	134.1	32 56.4	133.5	33 48.8	132.9	34 40.9	132.3	35 33.0	131.7	30
20	33 14.3	136.7	34 07.5	136.2	35 00.6	135.6	35 53.5	135.0	36 46.2	134.4	20
10	34 21.3	139.4	35 15.3	138.9	36 09.2	138.3	37 02.8	137.8	37 56.2	137.2	10
2 00	35 24.9	142.2	36 19.5	141.7	37 14.0	141.1	38 08.3	140.6	39 02.5	140.1	2 00
1 50	36 24.4	145.0	37 19.8	144.5	38 15.0	144.0	39 10.1	143.5	40 05.1	143.0	1 50
40	37 19.9	147.9	38 15.9	147.4	39 11.8	147.0	40 07.6	146.5	41 03.3	146.0	40
30	38 11.0	150.5	39 07.8	150.5	40 04.4	150.0	41 00.8	149.6	41 57.2	149.1	30
20	38 57.6	153.9	39 54.9	153.5	40 52.1	153.1	41 49.2	152.7	42 46.2	152.3	20
10	39 39.2	157.0	40 37.2	156.7	41 35.1	156.3	42 32.8	156.0	43 30.4	155.6	10
1 00	40 15.9	160.2	41 14.3	159.9	42 12.7	159.6	43 11.0	159.3	44 09.2	158.9	1 00
0 50	40 47.3	163.4	41 46.2	163.2	42 45.0	162.9	43 43.8	162.6	44 42.6	162.2	0 20
40	41 13.3	166.7	42 12.6	166.5	43 11.8	166.2	44 11.0	166.0	45 10.2	165.8	40
30	41 33.6	170.0	42 33.2	169.8	43 32.8	169.6	44 32.3	169.5	45 31.9	169.3	30
20	41 48.2	173.3	42 48.0	173.2	43 47.8	173.1	44 47.6	173.0	45 47.4	172.8	20
10	41 57.1	176.6	42 57.0	176.6	43 56.9	176.5	44 56.9	176.5	45 56.8	176.4	10
0 00	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 05.1	76.6	6 40
30					0 13.3	79.7	0 58.2	79.1	1 43.1	78.4	30
20	0 23.0	82.9	1 07.7	82.3	1 52.4	81.6	2 37.1	80.9	3 21.8	80.3	20
10	2 02.8	84.8	2 47.3	84.2	3 31.9	83.5	4 16.5	82.7	5 00.9	82.1	10
6 00	3 42.8	86.7	4 27.3	86.0	5 11.8	85.3	5 56.2	84.6	6 40.6	84.0	6 00
5 50	5 23.1	88.5	6 07.6	87.8	6 51.9	87.1	7 36.3	86.4	8 20.4	85.8	5 50
40	7 03.4	90.4	7 47.8	89.7	8 32.2	89.0	9 16.5	88.3	10 00.7	87.6	40
30	8 43.8	92.2	9 28.2	91.5	10 12.5	90.9	10 56.8	90.2	12 41.1	89.5	30
20	10 24.0	94.1	11 08.5	93.4	11 52.9	92.7	12 37.2	92.0	13 21.4	91.3	20
10	12 04.1	96.0	12 48.6	95.3	13 33.0	94.6	14 17.4	93.9	15 01.7	93.2	10
5 00	13 43.7	97.9	14 28.4	97.2	15 13.0	96.5	15 57.5	95.8	16 41.9	95.1	5 00
4 50	15 22.9	99.8	16 07.7	99.1	16 52.5	98.4	17 37.1	97.7	18 21.6	97.0	4 50
40	17 01.4	101.8	17 46.5	101.1	18 31.5	100.4	19 16.3	99.7	20 01.0	99.0	40
30	18 39.3	103.8	19 24.7	103.1	20 09.9	102.4	20 55.0	101.7	21 39.8	100.9	30
20	20 16.3	105.8	21 02.0	105.1	21 47.6	104.4	22 32.9	103.7	23 18.1	102.9	20
10	21 52.4	107.8	22 38.4	107.1	23 24.3	106.4	24 09.9	105.7	24 55.5	105.0	10
4 00	23 27.4	109.9	24 13.8	109.2	25 00.1	108.5	25 46.1	107.8	26 31.9	107.1	4 00
3 50	25 01.2	112.0	25 48.0	111.3	26 34.6	110.5	27 21.1	109.9	28 07.3	109.2	3 50
40	26 33.4	114.2	27 20.8	113.5	28 07.9	112.8	28 54.8	112.1	29 41.5	111.4	40
30	28 04.2	116.4	28 52.1	115.7	29 39.6	115.0	30 27.1	114.3	31 14.2	113.6	30
20	29 33.2	118.7	30 21.6	118.0	31 09.8	117.3	31 57.7	116.6	32 45.4	115.9	20
10	31 00.6	121.0	31 49.2	120.4	32 38.0	119.7	33 26.5	119.0	34 14.7	118.3	10
3 00	32 25.1	123.4	33 14.7	122.8	34 04.2	122.1	34 53.3	121.4	35 42.2	120.7	3 00
2 50	33 47.7	125.9	34 38.0	125.3	35 28.0	124.6	36 17.7	123.9	37 07.2	123.2	2 50
40	35 07.6	128.5	35 58.6	127.8	36 49.3	127.2	37 39.8	126.5	38 30.1	125.8	40
30	36 24.8	131.1	37 16.4	130.5	38 07.8	129.9	38 59.0	129.2	39 50.1	128.5	30
20	37 38.8	133.8	38 31.2	133.2	39 23.4	132.6	40 15.4	131.9	41 07.1	131.2	20
10	38 49.7	136.6	39 42.7	136.0	40 35.6	135.4	41 28.4	134.8	42 20.9	134.1	10
2 00	39 56.6	139.5	40 50.4	138.9	41 44.3	138.3	42 37.8	137.7	43 31.2	137.1	2 00
1 50	40 59.9	142.4	41 54.6	141.9	42 49.0	141.3	43 43.3	140.8	44 37.5	140.2	1 50
40	41 58.9	145.5	42 54.3	145.0	43 49.6	144.4	44 44.7	143.9	45 39.7	143.3	40
30	42 53.5	148.7	43 49.7	148.2	44 45.6	147.7	45 41.5	147.2	46 37.3	146.6	30
20	43 43.2	151.9	44 40.1	151.4	45 36.9	151.0	46 33.5	150.5	47 30.1	150.0	20
10	44 28.1	155.2	45 25.5	154.8	46 22.9	154.4	47 20.4	153.9	48 17.5	153.5	10
1 00	45 07.4	158.6	46 05.5	158.2	47 03.6	157.8	48 01.6	157.5	48 59.6	157.1	1 00
0 50	45 41.3	162.0	46 39.9	161.7	47 38.6	161.4	48 37.2	161.1	49 35.6	160.8	0 50
40	46 09.4	165.6	47 08.5	165.3	48 07.6	165.1	49 06.6	164.8	50 05.7	164.5	40
30	46 31.4	169.1	47 30.8	168.9	48 30.3	168.7	49 29.9	168.5	50 29.3	168.3	30
20	46 47.2	172.7	47 47.0	172.6	48 46.7	172.5	49 46.5	172.3	50 46.3	172.2	20
10	46 56.8	176.3	47 56.8	176.3	48 56.7	176.2	49 56.7	176.2	50 56.6	176.1	10
0 00	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 40.4	69.6	7 00
6 50					0 44.2	72.8	1 29.7	72.1	2 15.1	71.4	6 50
40	0 50.2	75.9	1 35.3	75.3	2 20.4	74.6	3 05.5	73.9	3 50.7	73.3	40
30	2 28.0	77.7	3 12.9	77.1	3 57.7	76.4	4 42.5	75.8	5 27.3	75.1	30
20	4 06.4	79.6	4 51.0	78.9	5 35.6	78.3	6 20.1	77.6	7 04.6	76.9	20
10	5 45.5	81.4	6 29.9	80.7	7 14.2	80.1	7 58.6	79.4	8 42.8	78.7	10
6 00	7 24.9	83.3	8 09.1	82.6	8 53.3	81.9	9 37.4	81.2	10 21.5	80.5	6 00
5 50	9 04.7	85.1	9 48.9	84.4	10 32.9	83.7	11 16.8	83.0	12 00.8	82.3	5 50
40	10 44.9	86.9	11 28.9	86.2	12 12.9	85.6	12 56.7	84.9	13 40.4	84.2	40
30	12 25.1	88.8	13 09.1	88.1	13 53.0	87.4	14 36.8	86.7	15 20.4	86.0	30
20	14 05.5	90.6	14 49.5	89.9	15 33.4	89.2	16 17.1	88.5	17 00.7	87.8	20
10	15 45.9	92.5	16 29.8	91.8	17 13.7	91.1	17 57.4	90.4	18 40.9	89.6	10
5 00	17 26.1	94.4	18 10.1	93.7	18 54.0	93.0	19 37.8	92.3	20 21.3	91.5	5 00
4 50	19 06.0	96.3	19 50.1	95.6	20 34.2	94.9	21 47.9	94.2	22 01.5	93.4	4 50
40	20 45.5	98.2	21 29.9	97.5	22 14.0	96.8	22 57.9	96.1	23 41.6	95.3	40
30	22 24.5	100.2	23 09.2	99.5	23 53.5	98.7	24 37.5	98.0	25 21.3	97.2	30
20	24 03.0	102.2	24 47.8	101.5	25 32.3	100.7	26 16.6	100.0	27 00.7	99.2	20
10	25 40.8	104.2	26 25.8	103.5	27 10.6	102.7	27 55.0	102.0	28 39.5	101.2	10
4 00	27 17.6	106.3	28 03.0	105.6	28 48.1	104.8	29 33.0	104.1	30 17.6	103.3	4 00
3 50	28 53.4	108.4	29 39.0	107.7	30 24.6	106.9	31 09.9	106.2	31 54.8	105.4	3 50
40	30 28.0	110.6	31 14.2	109.9	32 00.1	109.1	32 45.7	108.4	33 31.1	107.6	40
30	32 01.2	112.9	32 47.8	112.1	33 34.2	111.4	34 20.3	110.6	35 06.1	109.8	30
20	33 32.8	115.2	34 20.0	114.4	35 06.9	113.7	35 53.5	112.9	36 39.8	112.1	20
10	35 02.7	117.6	35 50.6	116.8	36 38.0	116.0	37 25.2	115.2	38 12.1	114.5	10
3 00	36 30.8	120.0	37 19.2	119.2	38 07.3	118.5	38 55.1	117.7	39 42.6	116.9	3 00
2 50	37 56.7	122.5	38 45.6	121.8	39 34.4	121.0	40 22.9	120.2	41 10.9	119.4	2 50
40	39 20.1	125.1	40 09.9	124.4	40 59.3	123.6	41 48.5	122.8	42 37.3	122.1	40
30	40 40.9	127.8	41 31.4	127.1	42 21.5	126.3	43 11.4	125.6	44 01.0	124.8	30
20	41 58.7	130.6	42 49.9	129.9	43 40.9	129.1	44 31.6	128.4	45 22.0	127.6	20
10	43 13.3	133.4	44 05.3	132.8	44 57.2	132.1	45 48.8	131.3	46 39.9	130.6	10
2 00	44 24.3	136.4	45 17.2	135.8	46 09.9	135.1	47 02.3	134.4	47 54.5	133.6	2 00
1 50	45 31.5	139.5	46 25.2	138.9	47 18.7	138.2	48 12.1	137.6	49 05.1	136.9	1 50
40	46 34.5	142.7	47 29.1	142.1	48 23.5	141.5	49 17.7	140.9	50 11.6	140.2	40
30	47 33.0	146.1	48 28.4	145.5	49 23.6	144.9	50 18.2	144.3	51 13.5	143.6	30
20	48 26.5	149.5	49 22.8	149.0	50 18.9	148.4	51 14.9	147.8	52 10.6	147.2	20
10	49 14.8	153.0	50 11.8	152.6	51 08.7	152.1	52 05.5	151.5	53 01.9	151.0	10
1 00	49 57.4	156.7	50 55.2	156.2	51 52.9	155.8	52 50.4	155.3	53 47.8	154.8	1 00
0 50	50 34.2	160.4	51 32.5	160.0	52 30.8	159.6	53 29.1	159.2	54 27.1	158.8	0 50
40	51 04.7	164.2	52 03.7	163.9	53 02.6	163.6	54 01.4	163.3	55 00.2	162.9	40
30	51 28.8	168.1	52 28.1	167.9	53 27.5	167.6	54 26.9	167.4	55 26.1	167.1	30
20	51 46.0	172.0	52 45.8	171.4	53 45.5	171.7	54 45.2	171.5	55 44.9	171.4	20
10	51 56.6	176.0	52 56.5	175.9	53 56.4	175.8	54 56.4	175.8	55 56.2	175.7	10
0 00	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20							0 05.5	63.4	1 27.9	62.7	7 20
10			0 39.4	66.5	1 25.4	65.8	2 11.6	65.2	2 57.8	64.5	10
7 00	1 26.1	69.0	2 11.9	68.3	2 57.7	67.7	3 43.4	67.0	4 29.1	66.4	7 00
6 50	3 00.5	70.8	3 45.8	70.1	4 31.1	69.5	5 59.9	68.8	6 01.7	68.2	6 50
40	4 35.7	72.6	5 20.7	72.0	6 05.6	71.3	6 50.5	70.6	7 35.4	70.0	40
30	6 12.0	74.4	6 56.6	73.8	7 41.1	73.1	8 25.7	72.4	9 10.2	71.7	30
20	7 49.0	76.2	8 33.3	75.6	9 17.6	74.9	10 01.8	74.2	10 46.0	73.5	20
10	9 27.0	78.0	10 10.9	77.3	10 54.9	76.6	11 33.4	75.9	12 22.7	75.2	10
6 00	11 05.5	79.8	11 49.3	79.1	12 33.0	78.4	13 16.6	77.7	14 00.1	77.0	6 00
5 50	12 44.4	81.6	13 28.1	80.9	14 11.5	80.2	14 54.9	79.5	15 38.2	78.8	5 50
40	14 24.1	83.4	15 07.5	82.7	15 50.8	82.0	16 34.0	81.3	17 17.0	80.6	40
30	16 03.8	85.2	16 47.1	84.5	17 30.2	83.8	18 13.4	83.1	18 56.2	82.3	30
20	17 44.1	87.1	18 27.3	86.4	19 10.7	85.6	19 53.2	84.9	20 35.9	84.1	20
10	19 24.3	88.9	20 07.4	88.2	20 50.4	87.4	21 33.2	86.7	22 15.8	85.9	10
5 00	21 04.7	90.8	21 47.9	90.0	22 30.9	89.3	23 13.6	88.5	23 56.1	87.7	5 00
4 50	22 44.9	92.7	23 28.1	91.9	24 11.1	91.2	24 53.8	90.4	25 36.4	89.6	4 50
40	24 25.1	94.6	25 08.4	93.8	25 51.5	93.0	26 34.3	92.2	27 16.8	91.4	40
30	26 05.0	96.5	26 48.4	95.7	27 31.5	94.9	28 14.4	94.1	28 57.1	93.3	30
20	27 44.5	98.5	28 28.1	97.7	29 11.4	96.9	29 54.4	96.1	30 37.2	95.3	20
10	29 23.6	100.5	30 07.2	99.7	30 50.8	98.9	31 33.9	98.1	32 16.9	97.3	10
4 00	31 02.0	102.5	31 46.0	101.7	32 29.7	100.9	33 13.2	100.1	33 56.3	99.3	4 00
3 50	32 38.5	104.6	33 23.8	103.8	34 07.9	103.0	34 51.6	102.2	35 35.0	101.3	3 50
40	34 16.2	106.8	35 00.9	106.0	35 45.3	105.1	36 29.3	104.3	37 13.0	103.4	40
30	35 51.7	109.0	36 36.7	108.2	37 21.5	107.3	38 06.0	106.5	38 50.2	105.6	30
20	37 25.9	111.3	38 11.5	110.5	38 56.8	109.6	39 41.7	108.8	40 26.3	107.9	20
10	38 58.7	113.7	39 44.8	112.8	40 30.6	112.0	41 16.1	111.1	42 01.2	110.2	10
3 00	40 29.7	116.1	41 16.5	115.3	42 02.9	114.4	42 49.0	113.5	43 34.6	112.6	3 00
2 50	41 58.9	118.6	42 46.1	117.8	43 33.2	116.9	44 19.9	116.1	45 06.2	115.2	2 50
40	43 25.9	121.2	44 14.0	120.4	45 01.8	119.6	45 49.2	118.7	46 36.2	117.8	40
30	44 50.4	124.0	45 39.1	123.2	46 27.8	122.3	47 15.9	121.4	48 03.7	120.5	30
20	46 12.2	126.8	47 01.9	126.0	47 51.3	125.2	48 40.3	124.3	49 29.0	123.4	20
10	47 30.9	129.8	48 21.5	129.0	49 11.8	128.2	50 01.7	127.4	50 51.2	126.5	10
2 00	48 46.4	132.9	49 37.9	132.1	50 29.1	131.3	51 19.9	130.5	52 10.4	129.6	2 00
1 50	49 57.8	136.1	50 50.2	135.3	51 42.5	134.5	52 34.4	133.7	53 25.9	132.9	1 50
40	51 05.4	139.5	51 58.8	138.7	52 51.9	138.0	53 44.8	137.2	54 37.4	136.4	40
30	52 08.2	143.0	53 02.5	142.3	53 56.7	141.6	54 50.7	140.8	55 44.2	140.0	30
20	53 06.2	146.6	54 01.6	146.0	54 56.7	145.3	55 51.5	144.6	56 46.1	143.8	20
10	53 58.5	150.4	54 54.7	149.8	55 50.8	149.2	56 46.8	148.5	57 42.5	147.8	10
1 00	54 45.2	154.3	55 42.3	153.8	56 39.3	153.2	57 36.1	152.7	58 32.8	152.0	1 00
0 50	55 25.4	158.4	56 23.2	157.9	57 21.1	157.4	58 18.8	156.9	59 16.5	156.4	0 50
40	55 59.0	162.6	56 57.6	162.2	57 56.2	161.8	58 54.6	161.4	59 53.0	160.9	40
30	56 25.5	166.8	57 24.6	166.5	58 23.8	166.2	59 22.9	165.9	60 22.0	165.5	30
20	56 44.6	171.2	57 44.3	171.0	58 43.9	170.8	59 43.5	170.5	60 43.1	170.3	20
10	56 56.1	175.6	57 55.9	175.5	58 56.0	175.4	59 55.9	175.2	60 55.7	175.1	10
0 00	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 50							0 20.5	54.7	1 08.7	54.1	7 50
40			0 07.9	57.8	0 55.6	57.2	1 43.3	56.6	2 31.0	56.0	40
30	0 46.6	60.3	1 33.8	59.6	2 20.9	59.0	3 07.9	58.4	3 55.1	57.8	30
20	2 14.5	62.1	3 01.1	61.5	3 47.8	60.8	4 34.4	60.2	5 20.9	59.6	20
10	3 43.8	63.9	4 30.1	63.3	5 16.1	62.6	6 02.1	62.0	6 48.2	61.3	10
7 00	5 14.8	65.7	6 00.4	65.1	6 46.0	64.4	7 31.5	63.8	8 16.9	63.1	7 00
6 50	6 46.8	67.5	7 32.0	66.8	8 17.2	66.1	9 02.2	65.5	9 47.1	64.8	6 50
40	8 20.1	69.3	9 04.8	68.6	9 49.5	67.9	10 34.1	67.2	11 18.6	66.5	40
30	9 54.6	71.0	10 38.9	70.4	11 23.1	69.6	12 07.2	69.0	12 51.2	68.3	30
20	11 30.0	72.8	12 13.9	72.1	12 57.8	71.4	13 41.5	70.7	14 25.1	70.0	20
10	13 06.3	74.5	13 49.9	73.8	14 33.3	73.1	15 16.7	72.4	15 59.8	71.7	10
6 00	14 43.5	76.3	15 26.7	75.6	16 09.8	74.9	16 52.8	74.1	17 35.6	73.4	6 00
5 50	16 21.2	78.0	17 04.2	77.3	17 47.2	76.6	18 29.7	75.9	19 12.2	75.1	5 50
40	17 59.9	79.8	18 42.6	79.1	19 25.1	78.3	20 07.5	77.6	20 49.6	76.8	40
30	19 38.8	81.6	20 21.4	80.8	21 03.7	80.0	21 45.7	79.3	22 27.6	78.5	30
20	21 18.4	83.4	22 00.7	82.6	22 42.8	81.8	23 24.7	81.1	24 06.3	80.3	20
10	22 58.2	85.2	23 40.4	84.4	24 22.4	83.6	25 03.9	82.8	25 45.4	82.0	10
5 00	24 38.4	87.0	25 20.5	86.2	26 02.3	85.4	26 43.8	84.6	27 25.1	83.8	5 00
4 50	26 18.7	88.8	27 00.7	88.0	27 42.4	87.2	28 23.8	86.4	29 04.9	85.6	4 50
40	27 59.1	90.6	28 41.1	89.8	29 22.8	89.0	30 04.2	88.2	30 45.2	87.4	40
30	29 39.3	92.5	30 21.3	91.7	31 03.1	90.9	31 44.4	90.0	32 25.4	89.2	30
20	31 19.6	94.5	32 01.7	93.6	32 43.5	92.8	33 24.9	91.9	34 05.9	91.0	20
10	32 59.3	96.4	33 41.7	95.6	34 23.6	94.7	35 05.0	93.8	35 46.2	92.9	10
4 00	34 39.0	98.4	35 21.4	97.6	36 03.4	96.7	36 45.1	95.8	37 26.3	94.9	4 00
3 50	36 17.9	100.5	37 00.6	99.6	37 42.9	98.7	38 24.7	97.8	39 06.1	96.9	3 50
40	37 56.3	102.6	38 39.3	101.7	39 21.8	100.8	40 04.0	99.9	40 45.6	98.9	40
30	39 33.8	104.8	40 17.2	103.8	41 00.1	102.9	41 42.4	102.0	42 24.5	101.1	30
20	41 10.4	107.0	41 54.1	106.1	42 37.4	105.2	43 20.3	104.2	44 02.6	103.3	20
10	42 45.7	109.3	43 29.9	108.4	44 13.7	107.5	44 57.0	106.5	45 39.7	105.5	10
3 00	44 19.8	111.7	45 04.6	110.8	45 48.9	109.9	46 32.7	108.9	47 16.0	107.9	3 00
2 50	45 52.1	114.3	46 37.5	113.3	47 22.5	112.4	48 06.8	111.3	48 50.7	110.3	2 50
40	47 22.7	116.9	48 08.8	115.9	48 54.4	114.9	49 39.6	113.9	50 24.1	112.9	40
30	48 51.1	119.6	49 38.0	118.7	50 24.5	117.7	51 10.2	116.7	51 55.5	115.6	30
20	50 17.1	122.5	51 04.8	121.5	51 52.1	120.5	52 38.9	119.5	53 25.1	118.5	20
10	51 40.2	125.6	52 28.9	124.6	53 17.2	123.6	54 04.8	122.6	54 51.9	121.5	10
2 00	53 00.4	128.7	53 50.1	127.7	54 39.3	126.7	55 28.1	125.7	56 16.2	124.7	2 00
1 50	54 16.9	132.0	55 07.6	131.1	55 57.9	130.1	56 47.7	129.1	57 36.9	128.1	1 50
40	55 29.5	135.5	56 21.2	134.6	57 12.6	133.7	58 03.6	132.7	58 54.0	131.7	40
30	56 37.5	139.2	57 30.4	138.3	58 23.0	137.4	59 15.0	136.4	60 06.9	135.5	30
20	57 40.4	144.1	58 34.5	142.2	59 28.3	141.4	60 21.8	140.5	61 14.8	139.5	20
10	58 37.9	147.1	59 33.0	146.3	60 28.0	145.6	61 22.9	144.8	62 16.9	143.9	10
1 00	59 29.2	151.4	60 25.5	150.7	61 21.6	150.0	62 17.5	149.2	63 13.0	148.4	1 00
0 50	60 13.7	155.8	61 11.1	155.2	62 08.5	154.5	63 05.2	153.9	64 02.1	153.2	0 50
40	60 51.3	160.4	61 49.5	159.9	62 47.6	159.4	63 45.6	158.8	64 43.4	158.2	40
30	61 21.0	165.1	62 19.9	164.7	63 18.8	164.3	64 17.7	163.9	65 16.3	163.4	30
20	61 42.6	170.0	62 42.1	169.7	63 41.6	169.5	64 41.1	169.2	65 40.5	168.9	20
10	61 55.5	174.9	62 55.4	174.8	63 55.5	174.6	64 55.2	174.5	65 55.0	174.3	10
0 00	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 40.4	91.8	0 55.8	92.5	0 11.1	93.2					5 50
40	3 20.6	93.7	2 35.9	94.4	1 51.2	95.1	1 06.4	95.7	0 21.7	96.4	40
30	5 00.7	95.6	4 15.9	96.3	3 31.0	96.9	2 46.2	97.6	2 01.4	98.2	30
20	6 40.3	97.5	5 55.4	98.1	5 10.4	98.8	4 25.4	99.5	3 40.3	100.1	20
10	8 19.7	99.4	7 34.6	100.0	6 49.3	100.7	6 04.2	101.3	5 18.9	102.0	10
5 00	9 58.4	101.3	9 13.1	101.9	8 27.7	102.6	7 42.2	103.2	6 56.7	103.9	5 00
4 50	11 36.5	103.2	10 50.9	103.8	10 05.2	104.5	9 19.6	105.1	8 33.8	105.8	4 50
40	13 13.8	105.1	12 27.9	105.8	11 41.9	106.5	10 55.8	107.1	10 09.7	107.8	40
30	14 50.2	107.1	14 04.0	107.8	13 17.7	108.4	12 31.2	109.1	11 44.8	109.7	30
20	16 25 6	109.1	15 39.0	109.8	14 52.4	110.4	14 05.6	111.1	13 18.7	111.7	20
10	17 59.8	111.1	17 12.8	111.8	16 25.8	112.4	15 38.6	113.1	14 51.3	113.7	10
4 00	19 32.8	113.2	18 45.4	113.9	17 57.8	114.5	17 10.2	115.2	16 22.4	115.8	4 00
3 50	21 04.3	115.3	20 16.4	116.0	19 28.4	116.6	18 40.3	117.3	17 52.0	117.9	3 50
40	22 34.1	117.5	21 45.7	118.1	20 57.2	118.8	20 08.6	119.4	19 19.8	120.0	40
30	24 02.3	119.7	23 13.3	120.3	22 24.2	121.0	21 35.2	121.6	20 45.8	122.2	30
20	25 28.5	121.9	24 39.0	122.6	23 49.3	123.2	22 59.5	123.8	22 09.6	124.4	20
10	26 52.5	124.2	26 02.6	124.9	25 12.2	125.5	24 21.9	126.1	23 31.6	126.7	10
3 00	28 14.4	126.6	27 23.7	127.2	26 32.8	127.8	25 41.8	128.4	24 50.6	129.0	3 00
2 50	29 33.6	129.0	28 42.2	129.6	27 50.8	130.2	26 59.2	130.8	26 07.4	131.4	2 50
40	30 50.2	131.5	29 58.2	132.1	29 06.0	132.7	28 13.7	133.2	27 21.2	133.8	40
30	32 03.8	134.1	31 11.2	134.7	30 18.2	135.2	29 25.3	135.7	28 32.2	136.3	30
20	33 14.3	136.7	32 20.9	137.3	31 27.4	137.8	30 33.7	138.3	29 39.9	138.8	20
10	34 21.3	139.4	33 27.3	139.9	32 33.1	140.4	31 38.8	140.9	30 44.3	141.4	10
2 00	35 24.9	142.2	34 30.1	142.7	33 35.2	143.1	32 40.1	143.6	31 45.0	144.1	2 00
1 50	36 24.4	145.0	35 29.0	145.5	34 33.4	145.9	33 37.8	146.4	32 42.0	146.8	1 50
40	37 19.9	147.9	36 23.8	148.3	35 27.5	148.8	34 31.2	149.2	33 34.8	149.6	40
30	38 11.0	150.9	37 14.3	151.3	36 17.4	151.7	35 20.5	152.1	34 23.6	152.4	30
20	38 57.6	153.9	38 00.2	154.3	37 02.7	154.6	36 05.2	155.0	35 07.6	155.3	20
10	39 39.2	157.0	38 41.4	157.3	37 43.3	157.6	36 45.3	158.0	35 47.2	158.3	10
1 00	40 15.9	160.2	39 17.4	160.5	38 18.9	160.7	37 20.4	161.0	36 21.8	161.3	1 00
0 50	40 47.3	163.4	39 48.4	163.6	38 49.4	163.8	37 50.5	164.1	36 51.5	164.3	0 50
40	41 13.3	166.7	40 14.0	166.9	39 14.6	167.0	38 15.3	167.2	37 15.9	167.4	40
30	41 33.6	170.0	40 34.0	170.1	39 34.4	170.2	38 34.8	170.4	37 35.2	170.5	30
20	41 48.2	173.3	40 48.4	173.4	39 48.5	173.5	38 48.7	173.6	37 48.8	173.7	20
10	41 57.1	176.6	40 57.1	176.7	39 57.1	176.7	38 57.2	176.8	37 57.2	176.8	10
0 00	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 16.4	98.9	0 31.5	99.6							5 30
20	2 55.3	100.8	2 10.2	101.2	1 25.1	102.1	0 40.0	102.8			20
10	4 33.7	102.7	3 48.3	103.5	3 02.9	104.0	2 17.5	104.6	1 32.1	105.3	10
5 00	6 11.2	104.6	5 25.5	105.2	4 39.9	105.9	3 54.2	106.5	3 08.5	107.2	5 00
4 50	7 47.9	106.5	7 01.9	107.1	6 16.0	107.8	5 29.9	108.4	4 43.9	109.1	4 50
40	9 23.5	108.4	8 37.3	109.1	7 51.0	109.7	7 04.6	110.3	6 18.2	111.0	40
30	10 58.4	110.4	10 11.6	111.0	9 24.9	111.6	8 38.1	112.3	7 51.3	112.9	30
20	12 31.7	112.4	11 44.7	113.0	10 57.5	113.6	10 10.3	114.3	9 23.0	114.9	20
10	14 03.8	114.4	13 16.3	115.0	12 28.8	115.6	11 41.1	116.3	10 53.4	116.9	10
4 00	15 34.6	116.4	14 46.6	117.0	13 58.5	117.6	13 10.4	118.3	12 22.2	118.9	4 00
3 50	17 03.6	118.5	16 15.4	119.1	15 26.6	119.7	14 37.9	120.3	13 49.1	120.9	3 50
40	18 30.9	120.6	17 41.9	121.2	16 52.7	121.8	16 03.5	122.4	15 14.2	123.0	40
30	19 56.3	122.8	19 06.8	123.4	18 17.1	124.0	17 27.3	124.5	16 37.4	125.1	30
20	21 19.6	125.0	20 29.4	125.6	19 29.2	126.2	18 48.8	126.7	17 58.3	127.3	20
10	22 40.8	127.3	21 50.0	127.8	20 59.2	128.4	20 08.1	128.9	19 17.0	129.5	10
3 00	23 59.4	129.6	23 08.0	130.1	22 16.5	130.7	21 24.9	131.2	20 33.2	131.8	3 00
2 50	25 15.4	131.9	24 23.4	132.5	23 31.3	133.0	22 39.1	133.5	21 46.6	134.1	2 50
40	26 28.7	134.3	25 36.0	134.9	24 43.2	135.4	23 50.3	135.9	22 57.3	136.4	40
30	27 39.1	136.8	26 45.6	137.3	25 52.2	137.8	24 58.6	138.3	24 05.1	138.8	30
20	28 46.0	139.3	27 52.1	139.8	26 58.0	140.3	36 03.8	140.8	25 09.5	141.3	20
10	29 49.8	141.9	28 55.1	142.4	28 00.4	142.8	27 05.5	143.3	26 10.6	143.8	10
2 00	30 49.8	144.5	29 54.5	145.0	28 59.2	145.4	28 03.7	145.9	27 08.1	146.3	2 00
1 50	31 46.2	147.2	30 50.2	147.7	29 54.2	148.1	28 58.1	148.5	28 01.9	148.9	1 50
40	32 38.3	150.0	31 41.8	150.4	30 45.2	150.8	29 48.5	151.2	28 51.8	151.6	40
30	33 26.5	152.8	32 29.3	153.2	31 32.1	153.5	30 34.8	153.9	29 37.6	154.3	30
20	34 10.0	155.7	33 12.3	156.0	32 14.6	156.3	31 16.8	156.7	30 19.0	157.0	20
10	34 49.1	158.6	33 50.8	158.9	32 52.6	159.2	31 54.4	159.5	30 56.0	159.7	10
1 00	35 23.2	161.6	34 24.6	161.8	33 25.9	162.1	32 27.2	162.3	31 28.5	162.5	1 00
0 50	35 52.5	164.6	34 53.4	164.8	33 54.4	165.0	32 55.4	165.2	31 56.1	165.4	0 50
40	36 16.5	167.6	35 17.2	167.8	34 17.8	168.0	33 18.4	168.1	32 19.0	168.3	40
30	36 35.6	170.7	35 35.8	170.8	34 36.2	170.9	33 36.6	171.0	32 36.9	171.2	30
20	36 49.0	173.8	35 49.2	173.9	34 49.4	174.0	33 49.6	174.0	32 49.7	174.1	20
10	36 57.2	176.9	35 57.2	176.9	34 57.4	177.0	33 57.5	177.0	32 57.5	177.1	10
0 00	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 46.7	105.9	0 01.2	106.6							5 10
5 00	2 22.8	107.8	1 37.0	108.5	0 51.2	109.1	0 05.4	109.8			5 00
4 50	3 57.8	109.7	3 11.6	110.4	2 25.5	111.0	1 39.3	111.6	0 53.1	112.2	4 50
40	5 31.7	111.6	4 45.2	112.3	3 58.6	112.9	3 12.0	113.5	2 25.4	114.1	40
30	7 04.3	113.5	6 17.5	114.2	5 30.5	114.8	4 43.3	115.4	3 56.3	116.0	30
20	8 35.7	115.5	7 48.3	116.1	7 00.8	116.7	6 13.3	117.3	5 25.7	118.0	20
10	10 05.6	117.5	9 17.6	118.1	8 29.7	118.7	7 41.6	119.3	6 53.4	119.9	10
4 00	11 33.8	119.5	10 45.4	120.1	9 56.9	120.7	9 08.4	121.3	8 19.8	121.9	4 00
3 50	13 00.2	121.5	12 11.2	122.1	11 22.3	122.7	10 33.1	123.3	9 44.1	123.9	3 50
40	14 24.8	123.6	13 35.4	124.2	12 45.8	124.8	11 56.1	125.3	11 06.4	125.9	40
30	15 47.4	125.7	14 57.3	126.3	14 07.1	126.9	13 16.8	127.4	12 26.6	128.0	30
20	17 07.7	127.9	16 17.1	128.4	15 26.3	129.0	14 35.5	129.5	13 44.6	130.1	20
10	18 25.8	130.1	17 34.5	130.6	16 43.1	131.2	15 51.7	131.7	15 00.1	132.2	10
3 00	19 41.3	132.3	18 49.4	132.8	17 57.4	133.4	17 05.3	133.9	16 13.2	134.4	3 00
2 50	20 54.2	134.6	20 01.6	135.1	19 09.0	135.6	18 16.3	136.1	17 23.5	136.6	2 50
40	22 04.2	136.9	21 11.1	137.4	20 17.8	137.9	19 24.4	138.4	18 31.0	138.9	40
30	23 11.3	139.3	22 17.5	139.8	21 23.5	140.2	20 29.5	140.7	19 35.4	141.2	30
20	24 15.1	141.7	23 20.6	142.2	22 26.1	142.6	21 31.5	143.1	20 36.8	143.5	20
10	25 15.6	144.2	24 20.5	144.6	23 25.3	145.0	22 30.1	145.5	21 34.8	145.9	10
2 00	26 12.5	146.7	25 16.8	147.1	24 21.0	147.5	23 25.2	147.9	22 29.3	148.3	2 00
1 50	27 05.7	149.3	26 09.4	149.7	25 13.0	150.0	24 16.6	150.4	23 20.1	150.8	1 50
40	27 55.0	151.9	26 58.1	152.3	26 01.2	152.6	25 04.2	153.0	24 07.2	153.3	40
30	28 40.2	154.6	27 42.8	154.9	26 45.3	155.2	25 47.8	155.5	24 50.3	155.8	30
20	29 21.1	157.3	28 23.2	157.6	27 25.3	157.9	26 27.3	158.2	25 29.3	158.4	20
10	29 57.7	160.0	28 59.3	160.3	28 01.0	160.5	27 02.5	160.8	26 03.9	161.0	10
1 00	30 29.8	162.8	29 31.0	163.0	28 32.2	163.2	27 33.4	163.5	26 34.5	163.7	1 00
0 50	30 57.1	165.6	29 57.8	165.8	28 58.7	166.0	27 59.5	166.2	27 00.3	166.4	0 50
40	31 19.6	168.4	30 20.1	168.6	29 20.7	168.8	28 21.2	168.9	27 21.8	169.1	40
30	31 37.2	171.3	30 37.5	171.4	29 37.9	171.5	28 38.1	171.6	27 38.4	171.8	30
20	31 49.9	174.2	30 50.0	174.3	29 50.1	174.4	28 50.3	174.4	27 50.4	174.5	20
10	31 57.5	177.1	30 57.5	177.1	29 57.5	177.2	28 57.5	177.2	27 57.7	177.2	10
0 00	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 06.9	112.9									4 50
40	1 38.7	114.8	0 52.1	115.4	0 05.5	116.0					40
30	3 09.3	116.7	2 22.1	117.3	1 34.9	117.9	0 47.8	118.5	0 00.6	119.1	30
20	4 38.1	118.6	3 50.5	119.2	3 02.9	119.8	2 15.2	120.4	1 27.5	121.0	20
10	6 05.5	120.5	5 17.2	121.1	4 29.1	121.7	3 40.9	122.3	2 52.7	122.9	10
4 00	7 31.1	122.5	6 42.4	123.1	5 53.6	123.6	5 04.8	124.2	4 16.0	124.8	4 00
3 50	8 54.8	124.5	8 05.6	125.0	7 16.2	125.6	6 26.8	126.2	5 37.4	126.8	3 50
40	10 16.6	126.5	9 26.7	127.0	8 36.8	127.6	7 46.8	128.2	6 56.8	128.7	40
30	11 36.2	128.5	10 45.7	129.1	9 55.1	129.6	9 04.7	130.2	8 14.1	130.7	30
20	12 53.6	130.6	12 02.5	131.2	11 11.4	131.7	10 20.2	132.2	9 28.9	132.7	20
10	14 08.6	132.7	13 16.8	133.3	12 25.1	133.8	11 33.2	134.3	10 41.4	134.8	10
3 00	15 20.9	134.9	14 28.6	135.4	13 36.2	135.9	12 43.8	136.4	11 51.3	136.9	3 00
2 50	16 30.7	137.1	15 37.7	137.6	14 44.7	138.1	13 51.6	138.6	12 58.4	139.0	2 50
40	17 37.5	139.3	16 43.9	139.8	15 50.3	140.3	14 56.6	140.8	14 02.8	141.2	40
30	18 41.4	141.6	17 47.1	142.1	16 52.9	142.5	15 58.5	143.0	15 04.2	143.4	30
20	19 42.0	143.9	18 47.2	144.4	17 52.3	144.8	16 57.4	145.2	16 02.4	145.6	20
10	20 39.4	146.3	19 44.1	146.7	18 48.5	147.1	17 53.0	147.5	16 57.4	147.9	10
2 00	21 33.4	148.7	20 37.4	149.1	19 41.3	149.5	18 45.2	149.9	17 49.0	150.2	2 00
1 50	22 23.2	151.2	21 27.1	151.5	20 30.4	151.9	19 33.8	152.2	18 37.1	152.5	1 50
40	23 10.1	153.6	22 13.0	154.0	21 15.9	154.3	20 18.7	154.6	19 21.5	154.9	40
30	23 52.8	156.1	22 55.1	156.5	21 57.4	156.8	20 59.8	157.0	20 02.1	157.3	30
20	24.31.3	158.7	23 33.2	159.0	22 35.1	159.3	21 36.9	159.5	20 38.7	159.8	20
10	25 05.6	161.3	24 07.0	161.5	23 08.4	161.8	22 09.9	162.0	21 11.5	162.2	10
1 00	25 35.6	163.9	24 36.7	164.1	23 37.8	164.3	22 38.8	164.5	21 39.9	164.7	1 00
0 50	26 01.1	166.6	25 02.0	166.7	24 02.8	166.9	23 03.4	167.0	22 04.2	167.2	0 50
40	26 22.3	169.2	25 22.8	169.4	24 23.3	169.5	23 23.7	169.6	22 24.2	169.8	40
30	26 38.8	171.9	25 39.0	172.0	24 39.2	172.1	23 39.6	172.2	22 39.8	172.3	30
20	26 50.6	174.6	25 50.7	174.7	24 50.8	174.7	23 51.0	174.8	22 51.1	174.9	20
10	26 57.7	177.3	25 57.7	177.3	24 57.8	177.3	23 57.8	177.4	22 57.8	177.4	10
0 00	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 20	0 39.8	121.6									4 20
10	2 04.2	123.5	1 16.1	124.1	0 27.7	124.7					10
4 00	3 27.1	125.4	2 38.2	126.0	1 49.4	126.6	1 00.5	127.1	0 11.6	127.7	4 00
3 50	4 48.0	127.3	3 58.5	127.9	3 09.0	128.5	2 19.5	129.0	1 30.0	129.6	3 50
40	6 06.8	129.3	5 16.7	129.8	4 26.6	130.4	3 36.5	130.9	2 46.3	131.5	40
30	7 23.3	131.3	6 32.7	131.8	5 41.9	132.3	4 51.2	132.8	4 00.4	133.4	30
20	8 37.6	133.3	7 46.3	133.8	6 54.9	134.3	6 03.5	134.8	5 12.1	135.3	20
10	9 49.4	135.3	8 57.4	135.8	8 05.4	136.3	7 13.4	136.8	6 21.4	137.3	10
3 00	10 58.7	137.4	10 06.1	137.9	9 13.5	138.4	8 20.8	138.9	7 28.1	139.4	3 00
2 50	12 05.2	139.5	11 12.0	140.0	11 28.7	140.5	9 25.4	140.9	8 32.2	141.4	2 50
40	13 09.0	141.7	12 15.2	142.1	11 21.3	142.6	10 27.4	143.0	9 33.4	143.4	40
30	14 09.7	143.9	13 15.2	144.3	12 20.7	144.7	11 26.2	145.1	10 31.6	145.5	30
20	15 07.4	146.1	14 12.3	146.5	13 17.2	146.9	12 22.1	147.3	11 26.9	147.7	20
10	16 01.7	148.3	15 06.1	148.7	14 10.4	149.1	13 14.7	149.5	12 18.9	149.8	10
2 00	16 52.8	150.6	15 56.6	151.0	15 00.3	151.3	14 03.9	151.7	13 07.7	152.0	2 00
1 50	17 40.3	152.9	16 43.5	153.3	15 46.7	153.6	14 49.9	153.9	13 53.0	154.2	1 50
40	18 24.2	155.2	17 26.9	155.6	16 29.6	155.9	15 32.2	156.2	14 34.8	156.5	40
30	19 04.2	157.6	18 06.4	157.9	17 08.7	158.2	16 10.8	158.5	15 13.2	158.8	30
20	19 40.5	160.0	18 42.3	160.3	17 44.1	160.6	16 45.9	160.8	15 47.6	161.1	20
10	20 12.7	162.4	19 14.1	162.7	18 15.5	162.9	17 16.9	163.1	16 18.2	163.4	10
1 00	20 40.9	164.9	19 41.9	165.1	18 43.0	165.3	17 44.0	165.5	16 45.0	165.7	1 00
0 50	21 04.8	167.4	20 05.6	167.6	19 06.4	167.7	18 07.0	167.9	17 07.7	168.0	0 50
40	21 24.6	169.9	20 25.1	170.1	19 25.6	170.2	18 26.0	170.3	17 26.5	170.4	40
30	21 40.1	172.4	20 40.2	172.5	19 40.6	172.6	18 40.8	172.7	17 40.9	172.8	30
20	21 51.2	174.9	20 51.3	175.0	19 51.4	175.1	18 51.5	175.1	17 51.6	175.2	20
10	21 57.7	177.4	20 57.7	177.5	19 57.8	177.5	18 57.8	177.5	17 57.9	177.6	10
0 0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	0 0

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——32

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 37.6	86.1	1 22.9	85.5	6 10
6 00	0 00.0	90.0	0 45.3	89.3	1 30.5	88.7	2 15.8	88.0	3 01.0	87.4	6 00
5 50	1 38.4	91.9	2 23.8	91.2	3 08.9	90.6	3 54.3	89.9	4 39.4	89.2	5 50
40	3 16.7	93.8	4 02.0	93.1	4 47.3	92.5	5 32.6	91.8	6 17.8	91.1	40
30	4 54.8	95.7	5 40.2	95.0	6 25.6	94.4	7 10.9	93.7	7 56.1	93.0	30
20	6 32.5	97.6	7 18.0	96.9	8 03.5	96.3	8 49.0	95.6	9 34.3	95.0	20
10	8 09.8	99.5	8 55.6	98.8	9 41.2	98.2	10 26.8	97.5	11 12.2	96.9	10
5 00	9 46.6	101.4	10 32.5	100.8	11 18.3	100.1	12 04.1	99.5	12 49.7	98.8	5 00
4 50	11 22.7	103.4	12 08.9	102.7	12 54.9	102.1	13 40.9	101.4	14 26.7	100.7	4 50
40	12 58.0	105.4	13 44.5	104.7	14 30.8	104.1	15 17.0	103.4	16 03.0	102.7	40
30	14 32.4	107.4	15 19.2	106.7	16 05.8	106.1	16 52.2	105.4	17 38.6	104.7	30
20	16 05.8	109.4	16 52.9	108.8	17 39.9	108.1	18 26.7	107.4	19 13.3	106.8	20
10	17 38.0	111.5	18 25.6	110.8	19 12.8	110.2	20 00.0	109.5	20 47.0	108.9	10
4 00	19 09.0	113.6	19 56.8	112.9	20 44.6	112.3	21 32.2	111.6	22 19.5	111.0	4 00
3 50	20 38.4	115.7	21 26.8	115.0	22 14.9	114.4	23 02.9	113.8	23 50.8	113.1	3 50
40	22 06.3	117.9	22 55.1	117.2	23 43.7	116.6	24 32.2	116.0	25 20.5	115.3	40
30	23 32.4	120.1	24 21.8	119.4	25 10.8	118.8	25 59.9	118.2	26 48.7	117.6	30
20	24 56.6	122.4	25 46.4	121.7	26 36.1	121.1	27 25.7	120.5	28 15.0	119.9	20
10	26 18.6	124.7	27 09.1	124.1	27 59.3	123.5	28 49.4	122.8	29 39.4	122.2	10
3 00	27 38.4	127.1	28 29.4	126.5	29 20.2	125.9	30 10.9	125.2	31 01.5	124.6	3 00
2 50	28 55.6	129.5	29 47.3	128.9	30 38.8	128.3	31 30.2	127.7	32 21.2	127.1	2 50
40	30 10.2	132.0	31 02.5	131.4	31 54.7	130.8	32 46.6	130.2	33 38.4	129.6	40
30	31 21.9	134.5	32 14.9	134.0	33 07.8	133.4	34 00.3	132.8	34 52.8	132.2	30
20	32 30.5	137.1	33 24.1	136.6	34 17.6	136.1	35 10.9	135.5	36 04.0	134.9	20
10	33 35.6	139.8	34 30.1	139.3	35 24.2	138.8	36 18.2	138.3	37 12.0	137.7	10
2 00	34 37.3	142.6	35 32.3	142.1	36 27.2	141.6	37 21.8	141.1	38 16.4	140.6	2 00
1 50	35 35.1	145.4	36 30.8	144.9	37 26.3	144.5	38 21.8	144.0	39 17.0	143.5	1 50
40	36 29.0	148.3	37 25.3	147.9	38 21.4	147.4	39 17.5	147.0	40 13.4	146.5	40
30	37 18.5	151.3	38 15.5	150.9	39 12.2	150.4	40 09.0	150.0	41 05.6	149.6	30
20	38 03.6	154.3	39 01.1	153.8	39 58.5	153.5	40 55.8	153.1	41 53.0	152.7	20
10	38 43.9	157.4	39 42.1	157.0	40 40.0	156.7	41 37.9	156.3	42 35.7	156.0	10
1 00	39 19.5	160.5	40 17.9	160.2	41 16.4	159.9	42 14.9	159.6	43 13.2	159.3	1 00
0 50	39 49.8	163.7	40 48.8	163.4	41 47.7	163.2	42 46.6	162.9	43 45.3	162.6	0 50
40	40 14.9	166.9	41 14.2	166.7	42 13.5	166.5	43 12.8	166.3	44 12.0	166.0	40
30	40 34.5	170.1	41 34.1	170.0	42 33.7	169.8	43 33.2	169.7	44 32.7	169.5	30
20	40 48.6	173.4	41 48.5	173.3	42 48.3	173.2	43 48.1	173.1	44 48.0	173.0	20
10	40 57.2	176.7	41 57.2	176.6	42 57.1	176.6	43 57.0	176.5	44 57.0	176.5	10
0 00	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 19.1	76.6	6 40
30					0 24.0	79.7	1 09.6	79.1	1 55.1	78.5	30
20	0 30.3	82.9	1 15.7	82.3	2 01.1	81.6	2 46.5	81.0	3 31.9	80.3	20
10	2 08.2	84.8	2 53.6	84.2	3 38.7	83.5	4 23.9	82.8	5 09.2	82.2	10
6 00	3 46.3	86.7	4 31.5	86.1	5 16.6	85.4	6 01.8	84.7	6 46.9	84.1	6 00
5 50	5 24.7	88.6	6 09.8	87.9	6 54.9	87.3	7 39.9	86.6	8 24.8	85.9	5 50
40	7 03.0	90.5	7 48.1	89.8	8 33.2	89.1	9 18.2	88.5	10 03.1	87.8	40
30	8 41.4	92.4	9 26.6	91.7	10 11.6	91.0	10 56.6	90.4	11 41.5	89.7	30
20	10 19.6	94.3	11 04.8	93.6	11 50.0	92.9	12 35.0	92.3	13 19.9	91.6	20
10	11 57.6	96.2	12 43.0	95.5	13 28.1	94.8	14 13.3	94.2	14 58.2	93.5	10
5 00	13 35.3	98.1	14 20.7	97.5	15 06.0	96.8	15 51.2	96.1	16 36.4	95.4	5 00
4 50	15 12.5	100.1	15 58.1	99.4	16 43.5	98.7	17 29.0	98.0	18 14.1	97.3	4 50
40	16 49.0	102.1	17 34.8	101.4	18 20.5	100.7	19 06.0	100.0	19 51.4	99.3	40
30	18 24.9	104.1	19 11.0	103.4	19 56.9	102.7	20 42.6	102.0	21 28.3	101.3	30
20	19 59.9	106.1	20 46.3	105.4	21 32.5	104.7	22 18.5	104.1	23 04.5	103.4	20
10	21 34.0	108.2	22 20.9	107.5	23 07.2	106.8	23 53.5	106.1	24 39.7	105.4	10
4 00	23 06.8	110.3	23 53.9	109.6	24 40.8	108.9	25 27.5	108.2	26 14.0	107.5	4 00
3 50	24 38.5	112.4	25 26.0	111.7	26 13.3	111.1	27 00.4	110.4	27 47.4	109.7	3 50
40	26 08.7	114.6	26 56.7	113.9	27 44.4	113.3	28 32.0	112.6	29 19.3	111.9	40
30	27 37.4	116.9	28 25.8	116.2	29 14.1	115.5	30 02.1	114.9	30 50.0	114.2	30
20	29 04.2	119.2	29 53.2	118.5	30 42.0	117.8	31 30.6	117.2	32 18.9	116.5	20
10	30 29.2	121.6	31 18.8	120.9	32 08.0	120.2	32 57.2	119.6	33 46.1	118.9	10
3 00	31 51.8	124.0	32 42.0	123.3	33 32.0	122.7	34 21.7	122.0	35 11.3	121.3	3 00
2 50	33 12.3	126.5	34 03.1	125.8	34 53.7	125.2	35 44.0	124.5	36 34.2	123.8	2 50
40	34 30.1	129.0	35 21.6	128.4	36 12.8	127.7	37 03.9	127.1	37 54.7	126.4	40
30	35 45.2	131.7	36 37.3	131.1	37 29.2	130.4	38 21.0	129.8	39 12.5	129.1	30
20	36 57.1	134.4	37 50.0	133.8	38 42.6	133.2	39 35.1	132.5	40 27.3	131.9	20
10	38 05.8	137.2	38 59.4	136.6	39 52.7	136.0	40 45.9	135.4	41 38.9	134.8	10
2 00	39 10.9	140.0	40 05.1	139.5	40 59.3	138.9	41 53.2	138.3	42 47.0	137.7	2 00
1 50	40 12.2	143.0	41 07.2	142.5	42 02.0	141.9	42 56.7	141.4	43 51.2	140.8	1 50
40	41 09.3	146.0	42 05.0	145.5	43 00.6	145.0	43 56.1	144.5	44 51.4	143.9	40
30	42 02.1	149.1	42 58.6	148.7	43 54.7	148.2	44 50.9	147.7	45 47.1	147.2	30
20	42 50.2	152.3	43 47.3	151.9	44 44.3	151.5	45 41.2	151.0	46 38.0	150.5	20
10	43 33.5	155.6	44 31.2	155.2	45 28.8	154.8	46 26.2	154.4	47 23.8	154.0	10
1 00	44 11.5	158.9	45 09.8	158.6	46 08.0	158.3	47 06.1	157.9	48 04.2	157.5	1 00
0 50	44 44.2	162.3	45 42.9	162.0	46 41.6	161.8	47 40.3	161.5	48 39.0	161.2	0 50
40	45 11.2	165.8	46 10.5	165.6	47 09.5	165.3	48 08.6	165.1	49 07.8	164.8	40
30	45 32.5	169.3	46 32.0	169.1	47 31.5	168.9	48 31.0	168.8	49 30.5	168.6	30
20	45 47.7	172.8	46 47.5	172.7	47 47.2	172.6	48 47.0	172.5	49 46.8	172.3	20
10	45 56.9	176.4	46 56.9	176.3	47 56.8	176.3	48 56.7	176.2	49 56.7	176.2	10
0 00	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00							0 14.9	70.2	1 01.3	69.6	7 00
6 50			0 15.9	73.4	1 02.0	72.8	1 48.1	72.1	2 34.1	71.5	6 50
40	1 04.9	75.9	1 50.6	75.3	2 36.4	74.6	3 22.1	74.0	4 07.9	73.4	40
30	2 40.7	77.8	3 26.3	77.2	4 11.7	76.5	4 57.2	75.8	5 42.7	75.2	30
20	4 17.2	79.7	5 02.5	79.0	5 47.8	78.4	6 33.0	77.7	7 18.1	77.0	20
10	5 54.3	81.5	6 39.4	80.8	7 24.5	80.2	8 09.6	79.5	8 54.4	78.8	10
6 00	7 31.9	83.4	8 16.8	82.7	9 01.7	82.1	9 46.5	81.4	10 31.2	80.7	6 00
5 50	9 09.7	85.2	9 54.7	84.6	10 39.4	83.9	11 24.1	83.2	12 08.7	82.5	5 50
40	10 48.0	87.1	11 32.8	86.5	12 17.4	85.8	13 02.0	85.1	13 46.4	84.4	40
30	12 26.3	89.0	13 11.0	88.3	13 55.6	87.6	14 40.0	86.9	15 24.4	86.2	30
20	14 04.7	90.9	14 49.4	90.2	15 34.0	89.5	16 18.4	88.8	17 02.8	88.1	20
10	15 43.1	92.8	16 27.9	92.1	17 12.4	91.4	17 56.8	90.7	18 41.1	90.0	10
5 00	17 21.3	94.7	18 06.1	94.0	18 50.7	93.3	19 35.2	92.6	20 19.5	91.9	5 00
4 50	18 59.2	96.6	19 44.1	95.9	20 28.9	95.2	21 13.4	94.5	21 57.8	93.8	4 50
40	20 36.7	98.6	21 21.8	97.9	22 06.7	97.2	22 51.3	96.5	23 35.8	95.8	40
30	22 13.7	100.6	22 59.1	99.9	23 44.0	99.2	24 28.9	98.5	25 13.5	97.7	30
20	23 50.1	102.7	24 35.6	101.9	25 20.8	101.2	26 05.9	100.5	26 50.8	99.7	20
10	25 25.7	104.7	26 11.5	104.0	26 57.1	103.3	27 42.4	102.5	28 27.6	101.8	10
4 00	27 00.4	106.8	27 46.6	106.1	28 32.5	105.4	29 18.1	104.6	30 03.5	103.9	4 00
3 50	28 34.1	109.0	29 20.6	108.2	30 06.8	107.5	30 52.9	106.8	31 38.7	106.0	3 50
40	30 06.6	111.2	30 53.5	110.4	31 40.1	109.7	32 26.5	109.0	33 12.7	108.2	40
30	31 37.5	113.5	32 24.9	112.7	33 12.1	112.0	33 58.8	111.2	34 45.4	110.5	30
20	33 07.0	115.8	33 54.9	115.0	34 42.6	114.3	35 29.9	113.5	36 17.0	112.8	20
10	34 34.7	118.2	35 23.2	117.4	36 11.4	116.7	36 59.2	115.9	37 46.8	115.2	10
3 00	36 00.5	120.6	36 49.6	119.8	37 38.4	119.1	38 26.9	118.4	39 15.1	117.6	3 00
2 50	37 24.1	123.1	38 13.8	122.4	39 03.2	121.7	39 52.4	121.0	40 41.1	120.2	2 50
40	38 45.3	125.7	39 35.7	125.0	40 25.8	124.3	41 15.6	123.6	42 05.1	122.8	40
30	40 03.7	128.4	40 54.9	127.8	41 45.6	127.1	42 36.2	126.4	43 26.5	125.6	30
20	41 19.4	131.2	42 11.2	130.6	43 02.7	129.9	43 54.1	129.2	44 45.1	128.4	20
10	42 31.7	134.1	43 24.4	133.5	44 16.7	132.8	45 08.8	132.1	46 00.7	131.4	10
2 00	43 40.6	137.1	44 33.9	136.5	45 27.2	135.8	46 20.1	135.1	47 12.8	134.4	2 00
1 50	44 45.6	140.2	45 39.9	139.6	46 33.8	138.9	47 27.6	138.3	48 21.1	137.6	1 50
40	45 46.6	143.4	46 41.5	142.8	47 36.3	142.2	48 30.9	141.6	49 25.3	140.9	40
30	46 42.9	146.7	47 38.8	146.1	48 34.3	145.6	49 29.8	145.0	50 24.9	144.4	30
20	47 34.7	150.0	48 31.2	149.5	49 27.6	149.0	50 23.8	148.5	51 20.0	147.9	20
10	48 21.1	153.5	49 18.3	153.1	50 15.6	152.6	51 12.5	152.1	52 09.5	151.6	10
1 00	49 02.2	157.1	50 00.2	156.7	50 58.0	156.3	51 55.7	155.9	52 53.3	155.4	1 00
0 50	49 37.5	160.8	50 36.1	160.5	51 34.5	160.1	52 32.9	159.7	53 31.1	159.3	0 50
40	50 06.9	164.5	51 06.0	164.3	52 05.0	164.0	53 03.9	163.7	54 02.8	163.3	40
30	50 30.0	168.3	51 29.6	168.1	52 28.8	167.9	53 28.2	167.7	54 27.7	167.4	30
20	50 46.6	172.2	51 46.4	172.1	52 46.1	171.9	53 45.8	171.7	54 45.6	171.6	20
10	50 56.6	176.1	51 56.6	176.0	52 56.6	175.9	53 56.5	175.8	54 56.5	175.8	10
0 00	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30									0 28.6	60.9	7 30
20					0 20.9	64.0	1 08.1	63.4	1 55.4	62.8	20
10	0 16.4	67.1	1 03.3	66.5	1 50.0	65.8	2 36.8	65.2	3 23.6	64.6	10
7 00	1 47.6	69.0	2 34.1	68.4	3 20.4	67.7	4 06.8	67.1	4 53.1	66.5	7 00
6 50	3 20.1	70.8	4 06.1	70.2	4 52.1	69.6	5 38.0	68.9	6 23.9	68.3	6 50
40	4 53.6	72.7	5 39.2	72.0	6 24.8	71.4	7 10.4	70.7	7 56.0	70.1	40
30	6 28.1	74.5	7 13.3	73.8	7 58.6	73.2	8 43.8	72.5	9 28.9	71.9	30
20	8 03.2	76.4	8 48.2	75.7	9 33.2	75.0	10 18.1	74.4	11 03.0	73.7	20
10	9 39.2	78.2	10 24.1	77.5	11 08.2	76.8	11 53.1	76.2	12 37.8	75.5	10
6 00	11 15.9	80.0	12 00.4	79.4	12 44.9	78.7	13 29.2	78.0	14 13.4	77.3	6 00
5 50	12 53.1	81.8	13 37.5	81.2	14 21.6	80.5	15 05.7	79.8	15 49.8	79.1	5 50
40	14 30.8	83.7	15 14.9	83.0	15 59.0	82.3	16 42.9	81.6	17 26.7	80.9	40
30	16 08.7	85.5	16 52.8	84.8	17 36.6	84.1	18 20.3	83.4	19 04.1	82.7	30
20	17 47.0	87.4	18 30.9	86.7	19 14.8	86.0	19 58.3	85.2	20 41.8	84.5	20
10	19 25.2	89.3	20 09.1	88.5	20 53.0	87.8	21 36.5	87.0	22 19.9	86.3	10
5 00	21 03.7	91.2	21 47.6	90.4	22 31.4	89.7	23 14.9	88.9	23 58.3	88.2	5 00
4 50	22 42.0	93.1	23 26.0	92.3	24 09.7	91.6	24 53.2	90.8	25 36.6	90.1	4 50
40	24 20.1	95.0	25 04.2	94.2	25 48.1	93.5	26 31.7	92.7	27 15.0	92.0	40
30	25 58.1	97.0	26 42.2	96.2	27 25.8	95.5	28 09.8	94.7	28 53.2	93.9	30
20	27 35.5	99.0	28 19.8	98.2	29 03.9	97.5	29 47.7	96.7	30 31.4	95.9	20
10	29 12.3	101.0	29 56.9	100.2	30 41.1	99.5	31 25.1	98.7	32 09.0	97.9	10
4 00	30 48.6	103.1	31 33.5	102.3	32 18.0	101.5	33 02.3	100.7	33 46.2	99.9	4 00
3 50	32 24.1	105.2	33 08.7	104.5	33 54.0	103.6	34 38.6	102.8	35 22.8	102.0	3 50
40	33 58.5	107.4	34 44.0	106.7	35 29.2	105.8	36 14.1	105.0	36 58.7	104.2	40
30	35 31.7	109.7	36 17.7	108.9	37 03.4	108.1	37 48.8	107.3	38 33.5	106.4	30
20	37 03.8	112.0	37 50.2	111.2	38 36.3	110.4	39 22.0	109.6	40 07.4	108.7	20
10	38 34.1	114.4	39 21.3	113.6	40 07.7	112.8	40 54.0	112.0	41 39.9	111.1	10
3 00	40 03.0	116.9	40 50.5	116.1	41 37.7	115.2	42 24.6	114.4	43 11.0	113.5	5 00
2 50	41 29.7	119.4	42 17.8	118.6	43 05.7	117.8	43 53.1	117.0	44 40.2	116.1	2 50
40	42 54.3	122.1	43 43.2	121.3	44 31.7	120.4	45 20.0	119.6	46 07.8	118.7	40
30	44 16.4	124.9	45 06.1	124.1	45 55.4	123.4	46 44.2	122.3	47 32.9	121.5	30
20	45 35.9	127.7	46 26.3	126.9	47 16.3	126.1	48 06.1	125.2	48 55.5	124.4	20
10	46 52.1	130.6	47 43.5	129.9	48 34.2	129.1	49 24.9	128.3	50 15.2	127.4	10
2 00	48 05.2	133.7	48 57.3	133.0	49 49.1	132.2	50 40.6	131.5	51 31.7	130.6	2 00
1 50	49 14.4	136.9	50 07.5	136.2	51 00.0	135.4	51 52.5	134.7	52 44.6	133.8	1 50
40	50 19.5	140.3	51 13.4	139.6	52 07.0	138.9	53 00.5	138.1	53 53.6	137.3	40
30	51 20.0	143.8	52 15.0	143.1	53 09.4	142.4	54 03.8	141.7	54 57.9	140.9	30
20	52 15.9	147.3	53 11.6	146.7	54 07.1	146.1	55 02.4	145.4	55 57.4	144.7	20
10	53 06.2	151.1	54 02.9	150.5	54 59.1	149.9	55 55.2	149.3	56 51.4	148.7	10
1 00	53 50.9	154.9	54 48.3	154.4	55 45.6	153.9	56 42.6	153.4	57 39.6	152.8	1 00
0 50	54 29.4	158.9	55 27.7	158.5	56 25.7	158.0	57 23.4	157.6	58 21.2	157.1	0 50
40	55 01.5	163.0	56 00.4	162.6	56 59.1	162.3	57 57.7	161.9	58 56.2	161.5	40
30	55 26.8	167.2	56 26.2	166.9	57 25.4	166.6	58 24.7	166.3	59 23.7	166.0	30
20	55 45.3	171.4	56 45.0	171.2	57 44.6	171.0	58 44.2	170.8	59 43.9	170.6	20
10	55 56.4	175.7	56 56.2	175.6	57 56.0	175.5	58 56.0	175.4	59 56.0	175.3	10
0 00	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

3h 00m

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00									0 25.1	52.3	8 00
7 50					0 06.3	55.3	0 55.2	54.7	1 43.9	54.1	7 50
40			0 39.9	57.8	1 28.2	57.2	2 16.4	56.6	3 04.6	56.0	40
30	1 16.4	60.3	2 04.1	59.7	2 51.7	59.0	3 39.5	58.4	4 27.2	57.8	30
20	2 42.6	62.1	3 29.8	61.3	4 17.0	60.9	5 04.1	60.3	5 51.2	59.7	20
10	4 10.2	63.9	4 57.0	63.3	5 43.7	62.7	6 30.2	62.1	7 17.5	61.5	10
7 00	5 39.4	65.8	6 26.6	65.2	7 11.8	64.5	7 58.0	63.9	8 44.0	63.3	7 00
6 50	7 09.7	67.6	7 55.6	67.0	8 41.2	66.3	9 27.0	65.7	10 12.7	65.0	6 50
40	8 41.4	69.4	9 26.7	68.8	10 12.1	68.1	10 57.3	67.4	11 42.4	66.8	40
30	10 14.0	71.2	10 59.0	70.6	11 43.8	69.8	12 28.7	69.2	13 13.4	68.5	30
20	11 47.7	73.0	12 32.3	72.3	13 16.8	71.6	14 01.2	71.0	14 45.4	70.3	20
10	13 22.2	74.8	14 06.5	74.1	14 50.7	73.4	15 34.7	72.7	16 18.6	72.0	10
6 00	14 57.5	76.6	15 41.5	75.9	16 25.1	75.2	17 09.1	74.4	17 52.6	73.7	6 00
5 50	16 33.6	78.4	17 17.3	77.6	18 00.8	76.9	18 44.2	76.2	19 27.4	75.4	5 50
40	18 10.3	80.2	18 53.7	79.4	19 37.0	78.7	20 20.2	77.9	21 03.1	77.2	40
30	19 47.4	82.0	20 30.7	81.2	21 13.7	80.5	21 56.7	79.7	22 39.3	78.9	30
20	21 25.1	83.8	22 08.2	83.0	22 51.1	82.3	23 33.8	81.5	24 16.2	80.7	20
10	23 03.1	85.6	23 46.1	84.8	24 28.7	84.1	25 11.4	83.3	25 53.6	82.5	10
5 00	24 41.3	87.4	25 24.2	86.7	26 06.9	85.9	26 49.2	85.1	27 31.3	84.3	5 00
4 50	26 19.7	89.3	27 02.4	88.5	27 45.0	87.7	28 27.4	86.9	29 09.4	86.1	4 50
40	27 58.1	91.2	28 40.9	90.4	29 23.5	89.6	30 05.8	88.8	30 47.7	88.0	40
30	29 36.5	93.1	30 19.2	92.3	31 01.7	91.5	31 44.2	90.7	32 26.0	89.8	30
20	31 14.6	95.1	31 57.5	94.2	32 40.2	93.4	33 22.5	92.6	34 04.5	91.7	20
10	32 52.4	97.1	33 35.5	96.2	34 18.2	95.4	35 00.7	94.5	35 42.7	93.6	10
4 00	34 29.9	99.1	35 13.1	98.2	35 56.1	97.4	36 38.6	96.5	37 20.8	95.6	4 00
3 50	36 06.7	101.2	36 50.2	100.3	37 33.5	99.5	38 16.2	98.6	38 58.5	97.7	3 50
40	37 42.9	103.3	38 26.7	102.5	39 10.2	101.6	39 53.3	100.7	40 35.8	99.8	40
30	39 18.2	105.5	40 02.4	104.7	40 46.1	103.8	41 29.5	102.9	42 12.5	102.0	30
20	40 52.4	107.8	41 37.0	106.9	42 21.2	106.0	43 05.1	105.1	43 48.4	104.2	20
10	42 25.6	110.2	43 10.6	109.3	43 55.2	108.4	44 39.6	107.4	45 23.2	106.5	10
3 00	43 57.1	112.6	44 42.8	111.7	45 28.0	110.8	46 12.8	109.9	46 57.1	108.9	3 00
2 50	45 27.1	115.2	46 13.2	114.3	46 59.2	113.3	47 44.6	112.4	48 29.3	111.4	2 50
40	46 55.1	117.8	47 42.1	116.9	48 28.6	116.0	49 14.7	115.0	50 00.2	114.0	40
30	48 21.0	120.6	49 08.7	119.7	49 56.0	118.8	50 42.9	117.8	51 29.1	116.8	30
20	49 44.4	123.5	50 33.0	122.6	51 21.1	121.6	52 08.8	120.6	52 55.9	119.7	20
10	51 05.0	126.5	51 54.5	125.6	52 43.5	124.7	53 32.1	123.7	54 20.1	122.7	10
2 00	52 22.5	129.7	53 12.9	128.8	54 02.9	127.9	54 52.5	126.9	55 41.5	125.9	2 00
1 50	53 36.3	133.0	54 27.7	132.1	55 18.7	131.2	56 09.5	130.3	56 59.5	129.3	1 50
40	54 46.3	136.5	55 38.7	135.6	56 30.8	134.7	57 22.5	133.8	58 13.7	132.8	40
30	55 51.7	140.2	56 45.2	139.3	57 38.3	138.4	58 31.2	137.5	59 23.6	136.6	30
20	56 52.2	144.0	57 46.8	143.2	58 41.1	142.4	59 35.1	141.6	60 28.7	140.7	20
10	57 47.2	148.0	58 43.0	147.3	59 38.2	146.5	60 33.3	145.7	61 28.1	144.9	10
1 00	58 36.4	152.2	59 33.0	151.5	60 29.4	150.8	61 25.7	150.2	62 21.7	149.5	1 00
0 50	59 19.0	156.5	60 16.5	155.9	61 14.0	155.3	62 11.2	154.7	63 08.2	154.1	0 50
40	59 54.7	161.0	60 53.0	160.5	61 51.3	160.0	62 49.5	159.5	63 47.5	159.0	40
30	60 22.9	165.6	61 22.0	165.3	62 21.0	164.9	63 19.9	164.5	64 18.6	164.0	30
20	60 43.4	170.4	61 43.0	170.2	62 42.6	169.9	63 42.1	169.6	64 41.6	169.3	20
10	60 55.9	175.2	61 55.7	175.0	62 55.5	174.9	63 55.5	174.8	64 55.4	174.6	10
0 00	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	65 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 38.4	91.9	0 53.2	92.5	0 07.8	93.2					5 50
40	3 16.7	93.8	2 31.3	94.4	1 45.9	95.1	1 00.5	95.7	0 15.1	96.4	40
30	4 54.8	95.7	4 09.3	96.3	3 23.8	97.0	2 38.2	97.6	1 52.7	98.3	30
20	6 32.5	97.6	5 46.9	98.2	5 01.2	98.9	4 15.5	99.5	3 29.8	100.2	20
10	8 09.8	99.5	7 24.1	100.1	6 38.2	100.8	5 52.4	101.4	5 06.4	102.1	10
5 00	9 46.6	101.4	9 00.7	102.1	8 14.6	102.7	7 28.4	103.4	6 42.3	104.0	5 00
4 50	11 22.7	103.4	10 36.4	104.0	9 50.1	104.7	9 03.8	105.3	8 17.3	105.9	4 50
40	12 58.0	105.4	12 11.5	106.0	11 24.9	106.7	10 38.1	107.3	9 51.4	107.9	40
30	14 32.4	107.4	13 45.6	108.0	12 58.7	108.7	12 11.6	109.3	12 24.6	109.9	30
20	16 05.8	109.4	15 18.6	110.0	14 31.4	110.7	13 44.0	111.3	12 56.5	111.9	20
10	17 38.0	111.5	16 50.5	112.1	16 02.8	112.7	15 14.9	113.4	14 27.1	114.0	10
4 00	19 09.0	113.6	18 21.0	114.2	17 32.8	114.8	16 44.6	115.4	15 56.2	116.1	4 00
3 50	20 38.4	115.7	19 49.9	116.3	19 01.3	116.9	18 12.7	117.5	17 33.8	118.2	3 50
40	22 06.3	117.9	21 17.3	118.5	20 28.2	119.1	19 39.0	119.7	18 49.7	120.3	40
30	23 32.4	120.1	22 42.9	120.7	21 53.3	121.3	21 03.6	121.9	20 13.8	122.5	30
20	24 56.6	122.4	24 06.6	123.0	23 16.4	123.6	22 26.1	124.2	21 35.6	124.7	20
10	26 18.6	124.7	25 28.0	125.3	24 37.2	125.9	23 46.4	126.5	22 55.5	127.0	10
3 00	27 38.4	127.1	26 47.2	127.6	25 55.9	128.2	25 04.4	128.8	24 12.7	129.3	3 00
2 50	28 55.6	129.5	28 03.6	130.0	27 11.8	130.6	26 19.8	131.2	25 27.6	131.7	2 50
40	30 10.2	132.0	29 17.8	132.5	28 25.2	133.1	27 32.5	133.6	26 39.6	134.2	40
30	31 21.9	134.5	30 28.8	135.1	29 35.6	135.6	28 42.2	136.1	27 48.8	136.6	30
20	32 30.5	137.1	31 36.8	137.7	30 42.8	138.2	29 48.8	138.7	28 54.7	139.2	20
10	33 35.6	139.8	32 41.2	140.3	31 46.8	140.8	30 52.1	141.3	29 57.3	141.8	10
2 00	34 37.3	142.6	33 42.3	143.1	32 47.1	143.5	31 51.8	144.0	30 56.4	144.4	2 00
1 50	35 35.1	145.4	34 39.4	145.9	33 43.7	146.3	32 47.8	146.7	31 51.8	147.1	1 50
40	36 29.0	148.3	35 32.7	148.7	34 36.2	149.1	33 39.6	149.5	32 43.0	149.9	40
30	37 18.5	151.3	36 21.5	151.7	35 24.5	152.0	34 27.5	152.4	33 30.2	152.7	30
20	38 03.6	154.3	37 06.1	154.6	36 08.5	155.0	35 10.8	155.3	34 13.1	155.6	20
10	38 43.9	157.4	37 45.9	157.7	36 47.8	158.0	35 49.6	158.3	34 51.5	158.5	10
1 00	39 19.5	160.5	38 20.9	160.7	37 22.2	161.0	36 23.6	161.3	35 25.0	161.5	1 00
0 50	39 49.8	163.7	38 50.8	163.9	37 51.8	164.1	36 52.8	164.3	35 53.7	164.5	0 50
40	40 14.9	166.9	39 15.5	167.0	38 16.1	167.2	37 16.8	167.4	36 17.4	167.6	40
30	40 34.5	170.1	39 34.8	170.2	38 35.2	170.4	37 35.6	170.5	36 36.0	170.7	30
20	40 48.6	173.4	39 48.8	173.5	38 49.0	173.6	37 49.1	173.7	36 49.3	173.8	20
10	40 57.2	176.7	39 57.2	176.7	38 57.2	176.8	37 57.2	176.8	36 57.3	176.9	10
0 00	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	1 07. 1	98. 9	0 21. 6	99. 6							5 30
20	2 44. 1	100. 8	1 58. 3	101. 5	1 12. 5	102. 1	0 26. 7	102. 8			20
10	4 20. 4	102. 7	3 34. 4	103. 4	2 48. 4	104. 0	2 02. 4	104. 7	1 16. 3	105. 3	10
5 00	5 56. 1	104. 7	5 09. 8	105. 3	4 23. 5	105. 9	3 37. 1	106. 6	2 50. 8	107. 2	5 00
4 50	7 30. 8	106. 6	6 44. 2	107. 2	5 57. 6	107. 8	5 11. 1	108. 5	4 24. 3	109. 1	4 50
40	9 04. 6	108. 6	8 17. 7	109. 2	7 30. 7	109. 8	6 43. 7	110. 5	7 56. 7	111. 1	40
30	10 37. 4	110. 6	9 50. 1	111. 2	9 02. 8	111. 8	8 15. 3	112. 4	7 27. 9	113. 0	30
20	12 08. 9	112. 6	11 21. 2	113. 2	10 33. 4	113. 8	9 45. 6	114. 4	8 57. 8	115. 0	20
10	13 39. 1	114. 6	12 50. 9	115. 2	12 02. 8	115. 8	11 14. 5	116. 4	10 26. 2	117. 0	10
4 00	15 07. 8	116. 7	14 19. 2	117. 3	13 30. 5	117. 9	12 41. 8	118. 5	11 53. 1	119. 1	4 00
3 50	16 34. 9	118. 8	15 45. 8	119. 4	14 56. 7	120. 0	14 07. 5	120. 5	13 18. 2	121. 1	3 50
40	18 00. 2	120. 9	17 10. 7	121. 5	16 21. 0	122. 1	15 31. 3	122. 7	14 41. 4	123. 2	40
30	19 23. 8	123. 1	18 33. 6	123. 7	17 43. 5	124. 2	16 53. 1	124. 8	16 02. 8	125. 4	30
20	20 45. 1	125. 3	19 54. 4	125. 9	19 03. 7	126. 4	18 12. 8	127. 0	17 21. 9	127. 6	20
10	22 04. 3	127. 6	21 13. 1	128. 1	20 21. 8	128. 7	19 30. 3	129. 2	18 38. 8	129. 8	10
3 00	23 21. 0	129. 9	22 29. 2	130. 4	21 37. 3	131. 0	20 45. 2	131. 5	19 53. 1	132. 1	3 00
2 50	24 35. 2	132. 3	23 42. 8	132. 8	22 50. 2	133. 3	21 57. 6	133. 8	21 04. 8	134. 4	2 50
40	25 46. 7	134. 7	24 53. 6	135. 2	24 00. 4	135. 7	23 07. 1	136. 2	22 13. 7	136. 7	40
30	26 55. 1	137. 1	26 01. 5	137. 6	25 07. 7	138. 1	24 13. 8	138. 6	23 19. 8	139. 1	30
20	28 00. 5	139. 7	27 06. 2	140. 1	26 11. 8	140. 6	25 17. 3	141. 1	24 22. 6	141. 5	20
10	29 02. 4	142. 3	28 07. 5	142. 7	27 12. 5	143. 1	26 17. 3	143. 6	25 22. 1	144. 0	10
2 00	30 00. 9	144. 9	29 05. 3	145. 3	28 09. 7	145. 7	27 13. 9	146. 2	26 18. 1	146. 6	2 00
1 50	30 55. 6	147. 6	29 59. 4	148. 0	29 03. 2	148. 4	28 06. 9	148. 8	27 10. 5	149. 2	1 50
40	31 46. 3	150. 3	30 49. 6	150. 7	29 52. 8	151. 1	28 55. 9	151. 4	27 59. 0	151. 8	40
30	32 32. 9	153. 1	31 35. 8	153. 5	30 38. 3	153. 8	29 40. 9	154. 1	28 43. 5	154. 5	30
20	33 15. 3	156. 0	32 17. 4	156. 3	31 19. 6	156. 6	30 21. 7	156. 9	29 23. 7	157. 2	20
10	33 53. 2	158. 8	32 54. 8	159. 1	31 56. 5	159. 4	30 58. 1	159. 7	29 59. 8	159. 9	10
1 00	34 26. 3	161. 8	33 27. 6	162. 0	32 28. 8	162. 3	31 30. 0	162. 5	30 31. 2	162. 7	1 00
0 50	34 54. 6	164. 7	33 55. 5	164. 9	32 56. 4	165. 2	31 57. 2	165. 4	30 58. 1	165. 6	0 50
40	35 17. 9	167. 8	34 18. 6	167. 9	33 19. 1	168. 1	32 19. 7	168. 3	31 20. 2	168. 4	40
30	35 36. 3	170. 8	34 36. 7	170. 9	33 37. 0	171. 1	32 37. 2	171. 2	31 37. 6	171. 3	30
20	35 49. 4	173. 8	34 49. 6	173. 9	33 49. 8	174. 0	32 49. 9	174. 1	31 50. 0	174. 2	20
10	35 57. 3	176. 9	34 57. 4	176. 9	33 57. 5	177. 0	32 57. 5	177. 0	31 57. 5	177. 1	10
0 00	36 0. 0	180. 0	35 0. 0	180. 0	34 0. 0	180. 0	33 0. 0	180. 0	32 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 30.3	106.0									5 10
5 00	2 04.4	107.9	1 18.0	108.5	0 31.6	109.1					5 00
4 50	3 37.6	109.8	2 50.8	110.4	2 04.0	111.0	1 17.2	111.6	0 30.4	112.3	4 50
40	5 09.6	111.7	4 22.4	112.3	3 35.3	112.9	2 48.1	113.5	2 00.8	114.2	40
30	6 40.4	113.6	5 52.9	114.2	5 05.1	114.8	4 17.6	115.5	3 29.9	116.1	30
20	8 09.9	115.6	7 21.9	116.2	6 33.8	116.8	5 45.7	117.4	4 57.5	118.0	20
10	9 37.8	117.6	8 49.3	118.2	8 00.8	118.8	7 12.2	119.4	6 23.7	120.0	10
4 00	11 04.2	119.7	10 15.2	120.2	9 26.2	120.8	8 37.2	121.4	7 48.1	122.0	4 00
3 50	12 28.8	121.7	11 39.3	122.3	10 49.7	122.8	10 00.2	123.4	9 10.6	124.0	3 50
40	13 51.5	123.8	13 01.6	124.4	12 11.5	124.9	11 21.3	125.5	10 31.2	126.1	40
30	15 12.3	125.9	14 21.7	126.5	13 31.1	127.0	12 40.4	127.6	11 49.6	128.2	30
20	16 30.8	128.1	15 39.7	128.7	14 48.5	129.2	13 57.2	129.7	13 05.9	130.3	20
10	17 47.1	130.3	16 55.4	130.9	16 03.5	131.4	15 11.4	131.9	14 19.7	132.4	10
3 00	19 00.8	132.6	18 08.5	133.1	17 16.1	133.6	16 23.7	134.1	15 31.1	134.6	3 00
2 50	20 12.0	134.9	19 19.1	135.4	18 26.0	135.9	17 33.0	136.3	16 39.8	136.8	2 50
40	21 20.3	137.2	20 26.8	137.7	19 33.2	138.2	18 39.5	138.6	17 45.7	139.1	40
30	22 25.7	139.6	21 31.5	140.0	20 37.2	140.5	19 43.1	140.9	18 48.7	141.4	30
20	23 27.9	142.0	22 33.1	142.4	21 38.3	142.9	20 43.4	143.3	19 48.5	143.7	20
10	24 26.8	144.5	23 31.5	144.9	22 36.0	145.3	21 40.7	145.7	20 45.0	146.1	10
2 00	25 22.3	147.0	24 26.3	147.4	23 30.3	147.8	22 34.3	148.2	21 38.2	148.5	2 00
1 50	26 14.1	149.6	25 17.5	149.9	24 21.0	150.3	23 24.4	150.7	22 27.8	151.0	1 50
40	27 02.0	152.2	26 04.9	152.5	25 07.9	152.8	24 10.7	153.2	23 13.5	153.5	40
30	27 45.9	154.8	26 48.4	155.1	25 50.7	155.4	24 53.1	155.7	23 55.4	156.0	30
20	28 25.7	157.5	27 27.8	157.8	26 29.7	158.1	25 31.6	158.3	24 33.5	158.6	20
10	29 01.3	160.2	28 02.8	160.5	27 04.3	160.7	26 05.8	160.9	25 07.3	161.2	10
1 00	29 32.4	163.0	28 33.5	163.2	27 34.7	163.4	26 35.8	163.6	25 36.9	163.8	1 00
0 50	29 58.9	165.8	28 59.7	165.9	28 00.4	166.1	27 01.2	166.3	26 02.0	166.5	0 50
40	30 20.8	168.6	29 21.3	168.7	28 21.8	168.9	27 22.3	169.0	26 22.9	169.2	40
30	30 37.9	171.4	29 38.2	171.5	28 38.4	171.6	27 38.8	171.7	26 39.1	171.9	30
20	30 50.2	174.3	29 50.3	174.3	28 50.4	174.4	27 50.6	174.5	26 50.7	174.6	20
10	30 57.5	177.1	29 57.5	177.2	28 57.6	177.2	27 57.7	177.2	26 57.8	177.3	10
0 00	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	1 13.6	114.8	0 26.4	115.4							4 40
30	2 42.3	116.7	1 54.6	117.3	1 06.7	117.9	0 19.1	118.6			30
20	4 09.4	188.6	3 21.2	119.2	2 33.0	119.8	1 44.8	120.4	0 56.6	121.0	20
10	5 34.9	120.6	4 46.1	121.2	3 57.5	121.8	3 08.8	122.3	2 20.0	122.9	10
4 00	6 58.9	122.6	6 09.6	123.2	5 20.3	123.7	4 31.0	124.3	3 41.7	124.8	4 00
3 50	8 20.9	124.6	7 30.7	125.2	6 41.1	125.7	5 51.4	126.3	5 01.4	126.8	3 50
40	9 40.9	126.6	8 50.6	127.2	8 00.2	127.7	7 09.7	128.3	6 19.3	128.8	40
30	10 58.7	128.7	10 17.4	129.2	9 16.9	129.7	8 26.1	130.3	7 34.7	130.8	30
20	12 14.5	130.8	11 23.0	131.3	10 31.4	131.8	9 39.8	132.4	8 48.1	132.9	20
10	13 27.8	132.9	12 35.7	133.4	11 43.4	133.9	10 51.3	134.5	9 59.0	134.9	10
3 00	14 38.5	135.1	13 45.8	135.6	12 53.1	136.1	12 00.3	136.6	11 07.4	137.0	3 00
2 50	15 46.6	137.3	14 53.2	137.8	13 59.9	138.3	13 06.6	138.7	12 13.1	139.2	2 50
40	16 51.9	139.6	15 58.0	140.0	15 04.1	140.5	14 10.1	140.9	13 16.0	141.4	40
30	17 54.2	141.9	16 59.8	142.3	16 05.2	142.7	15 10.7	143.1	14 15.9	143.6	30
20	18 53.4	144.2	17 58.4	144.6	17 03.2	145.0	16 08.0	145.4	15 12.8	145.8	20
10	19 49.5	146.5	18 53.8	146.9	17 58.1	147.3	17 02.3	147.7	16 06.5	148.1	10
2 00	20 42.1	148.9	19 45.9	149.3	18 49.5	149.7	17 53.2	150.0	16 56.8	150.4	2 00
1 50	21 31.0	151.3	20 24.3	151.7	19 37.4	152.1	18 40.7	152.4	17 43.8	152.7	1 50
40	22 16.3	153.8	21 19.1	154.1	20 21.8	154.5	19 24.4	154.8	18 27.1	155.1	40
30	22 57.8	156.3	22 00.1	156.6	21 02.2	156.9	20 04.5	157.2	19 06.6	157.5	30
20	23 35.3	158.9	22 37.1	159.1	21 38.9	159.4	20 40.6	159.7	19 42.4	159.9	20
10	24 08.8	161.5	23 10.1	161.7	22 11.5	161.9	21 12.8	162.1	20 14.2	162.3	10
1 00	24 37.9	164.0	23 39.0	164.3	22 40.0	164.5	21 41.0	164.7	20 42.0	164.8	1 00
0 50	25 02.8	166.7	24 03.6	166.9	23 04.3	167.0	22 04.9	167.2	21 05.6	167.3	0 50
40	25 23.4	169.3	24 23.9	169.5	23 24.3	169.6	22 24.7	169.7	21 25.1	169.8	40
30	25 39.2	172.0	24 39.6	172.1	23 39.8	172.2	22 40.1	172.3	21 40.2	172.4	30
20	25 50.9	174.6	24 51.0	174.7	23 51.1	174.8	22 51.2	174.9	21 51.3	174.9	20
10	25 56.4	177.3	24 56.2	177.3	23 56.0	177.4	22 56.0	177.4	21 57.8	177.4	10
0 00	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	°	°	° ′	°	h. m.
4 20	0 08.3	121.6									4 20
10	1 33.8	123.5	0 42.5	124.1							10
4 00	2 52.3	125.4	2 03.0	126.0	1 13.7	126.6	0 24.3	127.1			4 00
3 50	4 11.5	127.4	3 21.7	127.9	2 31.7	128.5	1 41.7	129.0	0 51.7	129.6	3 50
40	5 28.7	129.4	4 38.2	129.9	3 47.7	130.4	2 57.1	131.0	2 06.6	131.5	40
30	6 43.7	131.4	5 52.7	131.9	5 01.4	132.4	4 10.2	132.9	3 19.2	133.4	30
20	7 56.4	133.4	7 04.7	133.9	6 13.0	134.4	5 21.2	134.9	4 29.4	135.4	20
10	9 06.7	135.4	8 14.4	135.9	7 22.0	136.4	6 29.7	136.9	5 37.2	137.4	10
3 00	10 14.5	137.5	9 21.5	138.0	8 28.6	138.5	7 35.6	139.0	6 42.5	139.4	3 00
2 50	11 19.6	139.6	10 26.0	140.1	9 32.5	140.6	8 38.8	141.1	7 45.2	141.5	2 50
40	12 21.9	141.8	11 27.8	142.2	10 33.6	142.7	9 39.4	143.2	8 45.1	143.5	40
30	13 21.2	144.0	12 26.6	144.4	11 31.7	144.8	10 36.9	145.3	9 42.2	145.7	30
20	14 17.5	146.2	13 22.2	146.6	12 26.9	147.0	11 31.5	147.4	10 36.1	147.8	20
10	15 10.6	148.4	14 14.8	148.8	13 18.8	149.2	12 22.9	149.6	11 27.0	149.9	10
2 00	16 00.4	150.7	15 04.0	151.1	14 07.6	151.4	13 11.1	151.8	12 14.7	152.1	2 00
1 50	16 46.8	153.0	15 49.9	153.4	14 52.8	153.7	13 56.0	154.0	12 59.1	154.3	1 50
40	17 29.6	155.4	16 32.2	155.7	15 34.8	156.0	14 37.3	156.3	13 39.8	156.6	40
30	18 08.7	157.8	17 10.8	158.0	16 12.9	158.3	15 15.0	158.6	14 17.2	158.9	30
20	18 44.1	160.2	17 45.8	160.4	16 47.5	160.7	15 49.2	160.9	14 50.8	161.2	20
10	19 15.5	162.6	18 16.8	162.8	17 18.1	163.0	16 19.4	163.2	15 20.7	163.4	10
1 00	19 42.9	165.0	18 43.9	165.2	17 44.9	165.4	16 45.9	165.6	15 46.8	165.8	1 00
0 50	20 06.3	167.5	19 07.0	167.7	18 07.7	167.8	17 08.4	168.0	16 09.1	168.1	0 50
40	20 25.5	170.0	19 26.0	170.1	18 26.5	170.2	17 26.9	170.4	16 27.3	170.5	40
30	20 40.6	172.5	19 40.8	172.5	18 41.1	172.6	17 41.2	172.7	16 41.6	172.8	30
20	20 51.4	175.0	19 51.5	175.0	18 51.6	175.1	17 51.7	175.2	16 51.8	175.2	20
10	20 57.8	177.5	19 57.8	177.5	18 57.8	177.5	17 57.9	177.6	16 58.0	177.6	10
0 00	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 41.6	86.2	1 27.6	85.5	6 10
6 00	0 00.0	90.0	0 46.0	89.4	1 31.9	88.7	2 17.9	88.1	3 03.8	87.4	6 00
5 50	1 36.4	91.9	2 22.4	91.3	3 08.3	90.6	3 54.2	90.0	4 40.2	89.3	5 50
40	3 12.7	93.8	3 58.7	93.2	4 44.7	92.6	5 30.7	91.9	6 16.6	91.3	40
30	4 48.8	95.7	5 34.9	95.1	6 20.9	94.5	7 06.9	93.8	7 52.9	93.2	30
20	6 24.5	97.7	7 10.7	97.1	7 56.9	96.4	8 43.1	95.7	9 29.1	95.1	20
10	7 59.8	99.6	8 46.2	99.0	9 32.6	98.3	10 18.8	97.7	11 04.9	97.0	10
5 00	9 34.7	101.6	10 21.3	101.0	11 07.7	100.3	11 54.1	99.7	12 40.4	99.0	5 00
4 50	11 08.7	103.6	11 55.4	102.9	12 42.2	102.3	13 28.8	101.7	14 15.4	101.0	4 50
40	12 42.0	105.6	13 29.1	104.9	14 16.1	104.3	15 03.0	103.7	15 49.7	103.0	40
30	14 14.4	107.6	15 01.8	107.0	15 49.1	106.3	16 36.1	105.7	17 23.2	105.0	30
20	15 45.8	109.7	16 33.5	109.0	17 21.1	108.4	18 08.6	107.8	18 55.9	107.1	20
10	17 16.0	111.8	18 04.0	111.1	18 52.0	110.5	19 39.8	109.9	20 27.5	109.2	10
4 00	18 44.9	113.9	19 33.3	113.2	20 21.7	112.6	21 09.9	112.0	21 57.9	111.3	4 00
3 50	20 12.2	116.0	21 01.2	115.4	21 50.0	114.8	22 38.6	114.1	23 27.1	113.5	3 50
40	21 38.1	118.2	22 27.5	117.6	23 16.7	117.0	24 05.8	116.3	24 54.7	115.7	40
30	23 02.1	120.4	23 52.1	119.8	24 41.8	119.2	25 31.3	118.6	26 20.8	118.0	30
20	24 24.3	122.7	25 14.7	122.1	26 05.0	121.5	26 55.1	120.9	27 45.0	120.3	20
10	25 44.3	125.1	26 35.3	124.5	27 26.1	123.9	28 16.8	123.3	29 07.2	122.7	10
3 00	27 02.0	127.5	27 53.5	126.9	28 44.9	126.3	29 36.1	125.7	30 27.2	125.1	3 00
2 50	28 17.3	129.9	29 09.4	129.3	30 01.4	128.8	30 53.2	128.2	31 44.9	127.6	2 50
40	29 30.0	132.4	30 22.7	131.8	31 15.3	131.3	32 07.7	130.7	33 00.0	130.1	40
30	30 39.6	135.0	31 33.0	134.4	32 26.2	133.9	33 19.4	133.3	34 12.3	132.7	30
20	31 46.4	137.6	32 40.4	137.1	33 34.2	136.5	34 28.0	136.0	35 21.5	135.4	20
10	32 49.7	140.3	33 44.3	139.8	34 38.9	139.2	35 33.2	138.7	36 27.5	138.2	10
2 00	33 49.6	143.0	34 44.9	142.5	35 40.0	142.0	36 35.1	141.6	37 30.0	141.1	2 00
1 50	34 45.6	145.8	35 41.6	145.4	36 37.4	144.9	37 33.1	144.4	36 28.7	144.0	1 50
40	35 37.9	148.7	36 34.4	148.3	37 30.8	147.8	38 27.1	147.4	39 23.3	146.9	40
30	36 25.8	151.6	37 23.0	151.2	38 20.0	150.8	39 16.9	150.4	40 13.8	150.0	30
20	37 09.5	154.6	38 07.2	154.2	39 04.7	153.9	40 02.3	153.5	40 59.7	153.1	20
10	37 48.5	157.6	38 46.8	157.3	39 44.8	157.0	40 42.9	156.7	41 40.8	156.3	10
1 00	38 22.8	160.7	39 21.4	160.4	40 20.0	160.2	41 18.6	159.9	42 17.1	159.6	1 00
0 50	38 52.2	163.8	39 51.2	163.6	40 50.2	163.4	41 49.2	163.1	42 48.1	162.9	0 50
40	39 16.4	167.0	40 15.8	166.9	41 15.1	166.7	42 14.5	166.5	43 13.8	166.3	40
30	39 35.4	170.2	40 35.0	170.1	41 34.7	170.0	42 34.1	169.8	43 33.8	169.7	30
20	39 49.0	173.5	40 48.9	173.4	41 48.7	173.3	42 48.6	173.2	43 48.4	173.1	20
10	39 57.3	176.7	40 57.2	176.7	41 57.2	176.6	42 57.2	176.6	43 57.1	176.5	10
0 00	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 33.0	76.6	6 40
6 30					0 34.7	79.8	1 20.9	79.1	2 07.1	78.5	6 30
20	0 37.6	83.0	1 23.7	82.3	2 09.8	81.7	2 55.9	81.1	3 41.9	80.4	20
10	2 13.5	84.9	2 59.3	84.2	3 45.3	83.6	4 31.3	82.9	5 17.2	82.3	10
6 00	3 49.7	86.8	4 35.6	86.1	5 21.4	85.5	6 07.2	84.8	6 53.0	84.2	6 00
5 50	5 26.1	88.7	6 11.9	88.0	6 57.7	87.4	7 43.3	86.7	8 29.0	86.1	5 50
40	7 02.5	90.6	7 48.3	90.0	8 34.0	89.3	9 19.7	88.6	10 05.3	88.0	40
30	8 38.6	92.5	9 24.6	91.9	10 10.4	91.2	10 56.1	90.5	11 41.6	89.9	30
20	10 15.1	94.5	11 01.0	93.8	11 46.8	93.2	12 32.5	92.5	13 18.1	91.8	20
10	11 51.0	96.4	12 37.1	95.7	13 22.9	95.1	14 08.7	94.4	14 54.4	93.7	10
5 00	13 26 6	98.4	14 12.8	97.7	14 58.8	97.1	15 44.7	96.4	16 30.5	95.7	5 00
4 50	15 01.8	100.4	15 48.1	99.7	16 34.3	99.0	17 20.3	98.4	18 06.2	97.7	4 50
40	16 36.3	102.4	17 22.8	101.7	18 09.2	101.0	18 55.4	100.4	19 41.5	99.7	40
30	18 10.1	104.4	18 56.9	103.7	19 43.5	103.1	20 29.9	102.4	21 16.3	101.7	30
20	19 43.1	106.4	20 30.2	105.8	21 17.1	105.1	22 03.8	104.5	22 50.4	103.8	20
10	21 14.9	108.5	22 02.4	107.9	22 49.6	107.2	23 36.7	106.6	24 23.5	105.9	10
4 00	22 45.8	110.7	23 33.5	110.0	24 21.1	109.3	25 08.5	108.7	25 55.7	108.0	4 00
3 50	24 15.3	112.9	25 03.6	112.2	25 51.5	111.5	26 39.4	110.9	27 26.8	110.2	3 50
40	25 43.5	115.1	26 32.1	114.4	27 20.5	113.8	28 08.7	113.1	28 56.7	112.4	40
30	27 10.0	117.4	27 59.1	116.7	28 48.0	116.1	29 36.6	115.4	30 25.1	114.7	30
20	28 34.8	119.7	29 24.3	119.0	30 13.7	118.4	31 02.9	117.7	31 51.9	117.0	20
10	29 57.5	122.1	30 47.7	121.4	31 37.6	120.8	32 27.3	120.1	33 16.8	119.4	10
3 00	31 18.1	124.5	32 08.8	123.8	32 59.3	123.2	33 49.6	122.6	34 39.8	121.9	3 00
2 50	32 36.4	127.0	33 27.8	126.3	34 18.9	125.7	35 09.8	125.1	36 00.5	124.4	2 50
40	33 52.1	129.5	34 44.1	128.9	35 35.8	128.3	36 27.4	127.7	37 18.8	127.0	40
30	35 05.1	132.2	35 57.7	131.6	36 50.2	131.0	37 42.3	130.4	38 34.4	129.7	30
20	36 15.0	134.9	37 08.3	134.3	38 01.4	133.7	38 54.3	133.1	39 47.0	132.5	20
10	37 21.6	137.7	38 15.6	137.1	39 09.4	136.6	40 02.9	136.0	40 56.5	135.4	10
2 00	38 24.8	140.5	39 19.4	140.0	40 13.9	139.5	41 08.2	138.9	42 02.4	138.3	2 00
1 50	39 24.0	143.5	40 19.5	143.0	41 14.7	142.5	42 09.7	141.9	43 04.5	141.4	1 50
40	40 19.4	146.5	41 15.4	146.0	42 11.3	145.5	43 07.1	145.0	44 02.7	144.5	40
30	41 10.5	149.6	42 07.2	149.1	43 03.8	148.7	44 00.1	148.2	44 56.4	147.7	30
20	41 57.1	152.7	42 54.3	152.3	43 51.5	151.9	44 48.6	151.5	45 45.6	151.0	20
10	42 38.8	156.0	43 36.7	155.6	44 34.5	155.2	45 32.1	154.8	46 29.7	154.4	10
1 00	43 15.5	159.3	44 13.9	159.0	45 12.2	158.6	46 10.4	158.3	47 08.6	157.9	1 00
0 50	43 46.9	162.6	44 45.9	162.4	45 44.7	162.1	46 43.3	161.8	47 42.1	161.5	0 50
40	44 13.0	166.0	45 12.3	165.8	46 11.4	165.6	47 10.6	165.4	48 09.8	165.1	40
30	44 33.4	169.5	45 33.1	169.3	46 32.6	169.1	47 32.1	169.0	48 31.7	168.8	30
20	44 48.2	173.0	45 48.0	172.9	46 47.7	172.7	47 47.5	172.6	48 47.3	172.5	20
10	44 57.1	176.5	45 57.0	176.4	46 57.0	176.4	47 56.9	176.3	48 56.8	176.2	10
0 00	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00							0 35.2	70.2	1 22.2	69.6	7 00
6 50			0 33.1	73.4	1 19.8	72.8	2 06.4	72.2	2 53.1	71.5	6 50
40	1 19.5	76.0	2 05.9	75.3	2 52.3	74.7	3 38.7	74.1	4 25.1	73.4	40
30	2 53.3	77.9	3 39.4	77.2	4 25.7	76.6	5 11.9	75.9	5 57.9	75.2	30
20	4 27.9	79.8	5 13.9	79.1	5 59.8	78.5	6 45.7	77.8	7 31.5	77.1	20
10	6 03.1	81.7	6 48.8	81.0	7 34.6	80.3	8 20.3	79.7	9 05.9	79.0	10
6 00	7 38.7	83.5	8 24.3	82.9	9 09.9	82.2	9 55.4	81.6	10 40.8	80.9	6 00
5 50	9 14.6	85.4	10 00.1	84.8	10 45.6	84.1	11 31.0	83.4	12 16.3	82.7	5 50
40	10 50.9	87.3	11 36.4	86.7	12 21.7	86.0	13 07.0	85.3	13 52.1	84.6	40
30	12 27.2	89.2	13 12.6	88.6	13 57.9	87.9	14 43.1	87.2	15 28.1	86.5	30
20	14 03.6	91.1	14 49.0	90.5	15 34.3	89.8	16 19.5	89.1	17 04.5	88.4	20
10	15 39.9	93.0	16 25.4	92.4	17 10.8	91.7	17 55.9	91.0	18 41.0	90.3	10
5 00	17 16.1	95.0	18 01.7	94.3	18 47.0	93.7	19 32.2	93.0	20 17.3	92.3	5 00
4 50	18 52.0	97.0	19 37.6	96.3	20 23.1	95.6	21 08.4	94.9	21 53.5	94.2	4 50
40	20 27.5	99.0	21 13.3	98.3	21 58.9	97.6	22 44.3	96.9	23 29.6	96.2	40
30	22 02.4	101.0	22 48.4	100.3	23 34.3	99.6	24 19.9	98.9	25 05.3	98.2	30
20	23 36.8	103.1	24 23.0	102.4	25 09.0	101.7	25 54.8	101.0	26 40.4	100.2	20
10	25 10.3	105.2	25 56.7	104.5	26 43.1	103.8	27 29.1	103.0	28 14.9	102.3	10
4 00	26 42.8	107.3	27 29.7	106.6	28 16.3	105.9	29 02.7	105.2	29 48.8	104.4	4 00
3 50	28 14.3	109.5	29 01.5	108.8	29 48.6	108.1	30 35.2	107.4	31 21.7	106.6	3 50
40	29 44.6	111.7	30 32.2	111.0	31 19.6	110.3	32 06.7	109.6	32 53.6	108.8	40
30	31 13.3	114.0	32 01.5	113.3	32 49.3	112.6	33 36.8	111.8	34 24.3	111.1	30
20	32 40.7	116.3	33 29.3	115.6	34 17.6	114.9	35 05.7	114.2	35 53.5	113.5	20
10	34 06.2	118.7	34 55.3	118.0	35 44.1	117.3	36 32.8	116.6	37 21.1	115.9	10
3 00	35 29.7	121.2	36 19.5	120.5	37 08.9	119.8	37 58.0	119.1	38 46.9	118.3	3 00
2 50	36 51.0	123.8	37 41.3	123.1	38 31.4	122.4	39 21.1	121.7	40 10.6	120.9	2 50
40	38 10.0	126.4	39 00.9	125.7	39 51.6	125.0	40 42.0	124.3	41 32.2	123.6	40
30	39 26.2	129.1	40 17.8	128.4	41 09.2	127.8	42 00.4	127.1	42 51.3	126.4	30
20	40 39.6	131.9	41 31.9	131.2	42 24.0	130.6	43 15.9	129.9	44 07.5	129.2	20
10	41 49.7	134.7	42 42.7	134.1	43 35.7	133.5	44 28.3	132.8	45 20.8	132.1	10
2 00	42 56.4	137.7	43 50.2	137.1	44 43.9	136.5	45 37.3	135.9	46 30.4	135.2	2 00
1 50	43 59.4	140.8	44 53.8	140.2	45 48.3	139.6	46 42.6	139.0	47 36.4	138.4	1 50
40	44 58.2	144.0	45 53.5	143.4	46 48.7	142.8	47 43.7	142.2	48 38.5	141.6	40
30	45 52.7	147.2	46 48.8	146.7	47 44.7	146.2	48 40.4	145.6	49 36.3	145.1	30
20	46 42.5	150.6	47 39.3	150.1	48 35.9	149.6	49 32.4	149.1	50 28.9	148.6	20
10	47 27.3	154.0	48 24.8	153.6	49 22.1	153.2	50 19.3	152.7	51 16.5	152.2	10
1 00	48 06.8	157.6	49 04.9	157.2	50 02.9	156.8	51 00.8	156.4	51 58.6	155.9	1 00
0 50	48 40.7	161.2	49 39.4	160.8	50 38.0	160.5	51 36.6	160.2	52 35.0	159.8	0 50
40	49 09.0	164.8	50 08.1	164.6	51 07.2	164.3	52 06.3	164.0	53 05.2	163.7	40
30	49 31.1	168.6	50 30.7	168.4	51 30.2	168.2	52 29.7	168.0	53 29.0	167.7	30
20	49 47.1	172.4	50 46.9	172.2	51 46.7	172.1	52 46.4	171.9	53 46.2	171.8	20
10	49 56.8	176.2	50 56.7	176.1	51 56.7	176.0	52 56.7	175.9	53 56.5	175.9	10
0 00	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30							0 09.6	61.5	0 57.7	60.9	7 30
20					0 47.3	64.0	1 35.0	63.4	2 22.8	62.8	20
10	0 39.8	67.1	1 27.1	66.5	2 14.5	65.9	3 01.9	65.3	3 49.2	64.7	10
7 00	2 09.1	69.0	2 56.2	68.4	3 43.1	67.8	4 30.2	67.2	5 17.1	66.5	7 00
6 50	3 39.8	70.9	4 26.3	70.3	5 13.0	69.6	5 59.5	69.0	6 46.1	68.3	6 50
40	5 11.4	72.8	5 57.7	72.2	6 44.0	71.5	7 30.2	70.9	8 16.4	70.2	40
30	6 43.9	74.7	7 29.9	74.0	8 15.8	73.4	9 01.6	72.7	9 47.5	72.1	30
20	8 17.2	76.5	9 02.9	75.9	9 48.6	75.2	10 34.2	74.5	11 19.8	73.9	20
10	9 51.4	78.3	10 36.9	77.7	11 22.3	77.0	12 07.5	76.3	12 52.7	75.7	10
6 00	11 26.2	80.2	12 11.4	79.6	12 56.5	78.9	13 41.6	78.2	14 26.5	77.5	6 00
5 50	13 01.4	82.1	13 46.5	81.4	14 31.5	80.7	15 16.1	80.0	16 00.9	79.3	5 50
40	14 37.2	84.0	15 22.1	83.3	16 06.9	82.6	16 51.5	81.9	17 36.0	81.2	40
30	16 13.1	85.8	16 57.9	85.1	17 42.6	84.4	18 27.1	83.7	19 11.4	83.0	30
20	17 49.5	87.7	18 34.2	87.0	19 18.8	86.3	20 03.1	85.6	20 47.4	84.9	20
10	19 25.8	89.6	20 10.5	88.9	20 55.1	88.2	21 39.3	87.5	22 23.5	86.7	10
5 00	21 02.2	91.5	21 46.9	90.8	22 31.4	90.1	23 15.8	89.4	24 00.0	88.6	5 00
4 50	22 38.6	93.5	23 23.3	92.7	24 07.8	92.0	24 52.1	91.3	25 36.2	90.6	4 50
40	24 14.7	95.5	24 59.5	94.7	25 44.1	94.0	26 28.5	93.2	27 12.6	92.5	40
30	25 50.6	97.5	26 35.4	96.7	27 20.1	96.0	28 04.6	95.2	28 48.8	94.4	30
20	27 25.9	99.5	28 11.0	98.8	28 55.9	98.0	29 40.5	97.2	30 24.9	96.4	20
10	29 00.6	101.6	29 46.0	100.8	30 31.1	100.1	31 15.9	99.3	32 00.4	98.5	10
4 00	30 34.7	103.7	31 20.3	102.9	32 05.7	102.2	32 50.7	101.4	33 35.5	100.6	4 00
3 50	32 07.9	105.9	32 53.8	105.1	33 39.6	104.3	34 24.9	103.5	35 09.9	102.7	3 50
40	33 40.2	108.1	34 26.5	107.3	35 12.5	106.5	35 58.2	105.7	36 43.7	104.9	40
30	35 11.1	110.4	35 57.8	109.6	36 44.4	108.8	37 30.5	108.0	38 16.2	107.2	30
20	36 41.0	112.7	37 28.2	111.9	38 15.1	111.1	39 01.6	110.3	39 47.8	109.5	20
10	38 09.1	115.1	38 56.8	114.3	39 44.2	113.5	40 31.2	112.7	41 18.0	111.9	10
3 00	39 35.5	117.6	40 23.8	116.8	41 11.7	116.0	41 59.4	115.2	42 46.6	114.4	3 00
2 50	40 59.9	120.2	41 48.9	119.4	42 37.5	118.6	43 25.6	117.8	44 13.6	116.9	2 50
40	42 22.1	122.8	43 11.7	122.1	44 00.9	121.3	44 49.9	120.5	45 38.5	119.6	40
30	43 41.9	125.6	44 32.2	124.9	45 22.3	124.1	46 11.7	123.3	47 01.0	122.4	30
20	44 58.9	128.4	45 49.9	127.7	46 40.6	126.9	47 31.1	126.1	48 21.2	125.3	20
10	46 12.8	131.4	47 04.7	130.7	47 56.3	129.9	48 47.4	129.1	49 38.2	128.3	10
2 00	47 23.4	134.5	48 16.0	133.8	49 08.4	133.1	50 00.5	132.3	50 52.3	131.5	2 00
1 50	48 30.3	137.7	49 23.8	137.0	50 17.1	136.3	51 09.9	135.6	52 02.6	134.8	1 50
40	49 33.1	141.0	50 27.5	140.4	51 21.6	139.7	52 15.5	139.0	53 09.1	138.2	40
30	50 31.4	144.5	51 26.8	143.9	52 21.7	143.2	53 16.4	142.5	54 11.0	141.8	30
20	51 25.1	148.0	52 21.2	147.4	53 17.0	146.8	54 12.7	146.2	55 08.2	145.6	20
10	52 13.5	151.7	53 10.4	151.2	54 07.2	150.6	55 03.5	150.0	56 00.0	149.4	10
1 00	52 56.4	155.5	53 54.0	155.0	54 51.5	154.5	55 48.8	154.0	56 46.1	153.5	1 00
0 50	53 33.4	159.4	54 31.8	159.0	55 30.0	158.6	56 27.9	158.1	57 25.9	157.6	0 50
40	54 04.2	163.4	55 03.1	163.1	56 01.9	162.7	57 00.6	162.4	57 59.2	162.0	40
30	54 28.4	167.5	55 27.8	167.2	56 27.1	166.9	57 26.3	166.7	58 25.5	166.4	30
20	54 45.9	171.6	55 45.6	171.4	56 45.3	171.3	57 44.9	171.1	58 44.6	170.9	20
10	54 56.7	175.8	55 56.5	175.7	56 56.4	175.6	57 56.3	175.5	58 56.1	175.4	10
0 00	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00							0 11.9	52.9	1 01.8	52.3	8 00
7 50					0 40.4	55.3	1 29.7	54.8	2 19.1	54.2	7 50
40	0 23.2	58.4	1 11.9	57.8	2 00.7	57.2	2 49.4	56.7	3 38.1	56.1	40
30	1 46.1	60.3	2 34.3	59.7	3 22.5	59.1	4 10.7	58.5	4 59.0	57.9	30
20	3 10.7	62.2	3 58.4	61.6	4 46.1	61.0	5 33.9	60.4	6 21.4	59.7	20
10	4 36.5	64.0	5 23.9	63.4	6 11.0	62.8	6 58.2	62.2	7 45.1	61.5	10
7 00	6 04.0	65.9	6 50.8	65.3	7 37.6	64.6	8 24.3	64.0	9 11.0	63.4	7 00
6 50	7 32.6	67.7	8 19.0	67.1	9 05.2	66.4	9 51.5	65.8	10 37.8	65.2	6 50
40	9 02.5	69.6	9 48.5	68.9	10 34.5	68.3	11 20.3	67.6	12 06.0	67.0	40
30	10 33.2	71.4	11 18.8	70.7	12 04.4	70.1	12 49.9	69.4	13 35.3	68.8	30
20	12 05.2	73.2	12 50.5	72.5	13 35.6	71.9	14 20.7	71.2	15 05.6	70.6	20
10	13 37.8	75.0	14 22.7	74.3	15 07.7	73.7	15 52.4	73.0	16 37.0	72.3	10
6 00	15 11.3	76.8	15 56.0	76.1	16 40.5	75.5	17 25.0	74.8	18 09.2	74.1	6 00
5 50	16 45.5	78.6	17 30.0	77.9	18 14.2	77.2	18 58.4	76.5	19 42.4	75.8	5 50
40	18 20.3	80.5	19 04.5	79.8	19 48.6	79.0	20 32.5	78.3	21 16.2	77.6	40
30	19 55.7	82.3	20 39.7	81.6	21 23.5	80.8	22 07.2	80.1	22 50.6	79.4	30
20	21 31.4	84.1	22 15.3	83.4	22 59.0	82.7	23 42.5	81.9	24 25.7	81.2	20
10	23 07.4	86.0	23 51.2	85.2	24 34.7	84.5	25 18.1	83.8	26 01.2	83.0	10
5 00	24 43.8	87.9	25 27.5	87.1	26 10.9	86.4	26 54.1	85.6	27 37.0	84.8	5 00
4 50	26 20.1	89.8	27 03.8	89.0	27 47.1	88.2	28 30.4	87.4	29 13.2	86.6	4 50
40	27 56.5	91.7	28 40.2	90.9	29 23.6	90.1	30 06.7	89.3	30 49.5	88.5	40
30	29 32.8	93.7	30 16.5	92.9	30 59.9	92.1	31 43.1	91.3	32 25.9	90.5	30
20	31 08.9	95.7	31 52.7	94.9	32 36.2	94.0	33 19.5	93.2	34 02.3	92.4	20
10	32 44.7	97.7	33 28.7	96.9	34 12.2	96.0	34 55.6	95.2	35 38.6	94.4	10
4 00	34 20.0	99.8	35 04.1	99.0	35 48.0	98.1	36 31.4	97.3	37 14.5	96.4	4 00
3 50	35 54.7	101.9	36 39.2	101.1	37 23.2	100.2	38 06.8	99.4	38 50.2	98.5	3 50
40	37 28.7	104.1	38 13.4	103.2	38 57.7	102.4	39 41.7	101.5	40 25.2	100.6	40
30	39 01.7	106.3	39 46.7	105.5	40 31.5	104.6	41 15.7	103.7	41 59.7	102.8	30
20	40 33.6	108.6	41 19.1	107.8	42 04.2	106.9	42 49.0	106.0	43 33.2	105.1	20
10	42 04.3	111.0	42 50.3	110.2	43 35.9	109.3	44 21.1	108.4	45 05.8	107.5	10
3 00	43 33.5	113.5	44 20.0	112.7	45 06.2	111.8	45 51.9	110.8	46 37.1	109.9	3 00
2 50	45 01.1	116.1	45 48.2	115.2	46 34.9	114.3	47 21.2	113.3	48 07.1	112.4	2 50
40	46 26.6	118.8	47 14.4	117.9	48 01.8	117.0	48 48.8	116.0	49 35.3	115.1	40
30	47 50.0	121.6	48 38.6	120.7	49 26.7	119.8	50 14.4	118.8	51 01.6	117.9	30
20	49 10.9	124.5	50 00.2	123.6	50 49.2	122.7	51 37.7	121.7	52 25.7	120.8	20
10	50 28.9	127.5	51 19.1	126.6	52 08.9	125.7	52 58.2	124.8	53 47.2	123.9	10
2 00	51 43.7	130.7	52 34.8	129.8	53 25.6	128.9	54 16.0	128.0	55 05.8	127.1	2 00
1 50	52 55.0	133.9	53 47.2	133.1	54 38.7	132.3	55 30.1	131.4	56 21.1	130.5	1 50
40	54 02.4	137.4	54 55.4	136.6	55 48.1	135.8	56 40.5	134.9	57 32.4	134.0	40
30	55 05.4	141.1	55 59.4	140.3	56 53.1	139.5	57 46.5	138.6	58 39.6	137.8	30
20	56 03.4	144.9	56 58.4	144.1	57 53.2	143.4	58 47.7	142.6	59 41.8	141.8	20
10	56 56.1	148.8	57 52.1	148.1	58 48.0	147.4	59 43.5	146.7	60 38.9	146.0	10
1 00	57 43.1	152.9	58 40.1	152.3	59 36.8	151.7	60 33.4	151.0	61 29.8	150.3	1 00
0 50	58 23.9	157.1	59 21.7	156.6	60 19.3	156.1	61 16.7	155.5	62 14.2	154.9	0 50
40	58 57.8	161.5	59 56.3	161.1	60 54.7	160.7	61 53.1	160.2	62 51.3	159.7	40
30	59 24.7	166.0	60 23.9	165.7	61 23.0	165.4	62 22.0	165.0	63 21.1	164.6	30
20	59 44.2	170.6	60 43.8	170.4	61 43.4	170.2	62 43.0	170.0	63 42.5	169.7	20
10	59 56.0	175.3	60 56.0	175.2	61 55.9	175.1	62 55.7	175.0	63 55.7	174.9	10
0 00	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	64 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 36.4	91.9	0 50.4	92.5	0 04.4	93.2					5 50
40	3 12.7	93.8	2 26.7	94.5	1 40.6	95.1	0 54.5	95.8	0 08.5	96.4	40
30	4 48.8	95.7	4 02.6	96.4	3 16.4	97.0	2 30.2	97.7	1 44.0	98.3	30
20	6 24.5	97.7	5 38.2	98.3	4 51.9	99.0	4 05.6	99.6	3 19.2	100.2	20
10	7 59.8	99.6	7 13.4	100.2	6 26.9	100.9	5 40.4	101.5	4 53.8	102.1	10
5 00	9 34.7	101.6	8 48.1	102.2	8 01.3	102.9	7 14.5	103.5	6 27.7	104.1	5 00
4 50	11 08.7	103.6	10 21.9	104.2	9 34.8	104.9	8 47.8	105.5	8 00.8	106.1	4 50
40	12 42.0	105.6	11 54.8	106.2	11 07.6	106.9	10 20.3	107.5	9 32.9	108.1	40
30	14 14.4	107.6	13 26.9	108.2	12 39.4	108.9	11 51.7	109.5	11 03.9	110.1	30
20	15 45.8	109.7	14 58.0	110.3	14 10.1	110.9	13 22.1	111.5	12 34.0	112.1	20
10	17 16.0	111.8	16 27.8	112.4	15 39.4	113.0	14 51.1	113.6	14 02.6	114.2	10
4 00	18 44.9	113.9	17 56.3	114.5	17 07.6	115.1	16 18.7	115.7	15 29.8	116.3	4 00
3 50	20 12.2	116.0	19 23.2	116.6	18 34.1	117.2	17 44.8	117.8	16 55.4	118.4	3 50
40	21 38.1	118.2	20 48.6	118.8	19 58.9	119.4	19 09.2	120.0	18 19.3	120.6	40
30	23 02.1	120.4	22 12.2	121.0	21 21.9	121.6	20 31.8	122.2	19 41.3	122.8	30
20	24 24.3	122.7	23 33.8	123.3	22 43.1	123.9	21 52.3	124.5	21 01.4	125.1	20
10	25 44.3	125.1	24 53.2	125.6	24 02.0	126.2	23 10.7	126.8	22 19.1	127.4	10
3 00	27 02.0	127.5	26 10.4	128.0	25 18.6	128.6	24 26.6	129.1	23 34.6	129.7	3 00
2 50	28 17.3	129.9	27 25.0	130.4	26 32.6	131.0	25 40.1	131.5	24 47.5	132.1	2 50
40	29 30.0	132.4	28 37.1	132.9	27 44.1	133.5	26 51.0	134.0	25 57.7	134.5	40
30	30 39.6	135.0	29 46.1	135.5	28 52.5	136.0	27 58.9	136.5	27 05.0	137.0	30
20	31 46.4	137.6	30 52.3	138.1	29 58.0	138.6	29 03.7	139.1	28 09.2	139.5	20
10	32 49.7	140.3	31 54.9	140.7	31 00.1	141.2	30 05.1	141.7	29 10.0	142.1	10
2 00	33 49.6	143.0	32 54.2	143.4	31 58.7	143.9	31 03.2	144.4	30 07.5	144.8	2 00
1 50	34 45.6	145.8	33 49.7	146.2	32 53.6	146.7	31 57.5	147.1	31 01.2	147.5	1 50
40	35 37.9	148.7	34 41.3	149.1	33 44.7	149.5	32 47.9	149.9	31 51.1	150.3	40
30	36 25.8	151.6	35 28.8	152.0	34 31.5	152.4	33 34.2	152.7	32 36.8	153.1	30
20	37 09.5	154.6	36 11.8	154.9	35 14.1	155.3	34 16.3	155.6	33 18.4	155.9	20
10	37 48.5	157.6	36 50.4	157.9	35 52.1	158.2	34 53.9	158.5	33 55.5	158.8	10
1 00	38 22.8	160.7	37 24.2	161.0	36 25.5	161.2	35 26.8	161.5	34 28.1	161.8	1 00
0 50	38 52.2	163.8	37 53.1	164.1	36 54.0	164.3	35 55.0	164.5	34 55.8	164.8	0 50
40	39 16.4	167.0	38 17.0	167.2	37 17.6	167.4	36 18.2	167.6	35 18.8	167.8	40
30	39 35.4	170.2	38 35.8	170.4	37 36.1	170.5	36 36.4	170.7	35 36.7	170.8	30
20	39 49.0	173.5	38 49.2	173.6	37 49.4	173.7	36 49.5	173.8	35 49.7	173.8	20
10	39 57.3	176.7	38 57.3	176.8	37 57.4	176.8	36 57.4	176.9	35 57.4	176.9	10
0 00	40 0.0	180.0	39 0.0	180.0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to Eas ; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 57.8	98.9	0 11.6	99.6							5 30
20	2 32.8	100.9	1 46.3	101.5	0 59.9	102.2	0 13.4	102.8			20
10	0 07.2	102.8	3 20.6	103.4	2 33.8	104.1	1 47.1	104.7	1 00.4	105.3	10
5 00	5 40.8	104.8	4 53.9	105.4	4 07.0	106.0	3 20.0	106.6	2 33.0	107.2	5 00
4 50	7 13.6	106.7	6 26.4	107.3	5 39.1	107.9	4 51.9	108.5	4 04.6	109.2	4 50
40	8 45.5	108.7	7 57.9	109.3	7 10.3	109.9	6 22.7	110.5	5 35.1	111.2	40
30	10 16.2	110.7	9 28.4	111.3	8 40.3	111.9	7 52.3	112.5	7 04.3	113.1	30
20	11 45.8	112.7	10 57.5	113.4	10 09.2	114.0	9 20.8	114.5	8 32.4	115.1	20
10	13 13.9	114.8	12 25.3	115.4	11 36.5	116.0	10 47.8	116.6	9 58.9	117.2	10
4 00	14 40.8	116.9	13 51.6	117.5	13 02.4	118.1	12 13.1	118.7	11 23.8	119.2	4 00
3 50	16 05.9	119.0	15 16.4	119.6	14 26.6	120.2	13 37.0	120.8	12 47.1	121.3	3 50
40	17 29.3	121.2	16 39.2	121.8	15 49.1	122.3	14 58.8	122.9	14 08.5	123.5	40
30	18 50.9	123.4	18 00.3	124.0	17 09.6	124.5	16 18.8	125.1	15 27.9	125.6	30
20	20 10.4	125.6	19 19.2	126.2	18 28.0	126.7	17 36.6	127.3	16 45.2	127.8	20
10	21 27.6	127.9	20 35.9	128.5	19 44.1	129.0	18 52.2	129.5	18 00.2	130.0	10
3 00	22 42.4	130.2	21 50.2	130.8	20 57.8	131.3	20 05.3	131.8	19 12.8	132.3	3 00
2 50	23 54.8	132.6	23 02.0	133.1	22 08.9	133.6	21 16.0	134.1	20 22.8	134.6	2 50
40	25 04.4	135.0	24 10.9	135.5	23 17.3	136.0	22 23.7	136.5	21 30.0	137.0	40
30	26 11.1	137.5	25 17.0	138.0	24 22.8	138.4	23 28.6	138.9	22 34.4	139.4	30
20	27 14.7	140.0	26 20.0	140.5	25 25.3	140.9	24 30.5	141.4	23 35.6	141.8	20
10	28 14.9	142.6	27 19.7	143.0	26 24.3	143.4	25 28.9	143.9	24 33.5	144.3	10
2 00	29 11.7	145.2	28 15.9	145.6	27 20.0	146.0	26 24.0	146.5	25 28.0	146.9	2 00
1 50	30 04.8	147.9	29 08.5	148.3	28 12.0	148.7	27 15.5	149.1	26 18.8	149.4	1 50
40	30 54.2	150.6	29 57.2	151.0	29 00.2	151.4	28 03.1	151.7	27 06.0	152.0	40
30	31 39.4	153.4	30 42.0	153.7	29 44.5	154.1	28 46.8	154.4	27 49.3	154.7	30
20	32 20.5	156.2	31 22.5	156.5	30 24.5	156.8	29 26.5	157.1	28 28.4	157.4	20
10	32 57.2	159.1	31 58.8	159.3	31 00.4	159.6	30 01.8	159.9	29 03.3	160.1	10
1 00	33 29.3	162.0	32 30.5	162.2	31 31.6	162.5	30 32.7	162.7	29 33.8	162.9	1 00
0 50	33 56.8	164.9	32 57.6	165.1	31 58.4	165.3	30 59.2	165.5	30 00.0	165.7	0 50
40	34 19.3	167.9	33 19.9	168.1	32 20.4	168.2	31 20.9	168.4	30 21.4	168.6	40
30	34 37.1	170.9	33 37.4	171.0	32 37.7	171.1	31 38.0	171.3	30 38.2	171.4	30
20	34 49.8	173.9	33 50.0	174.0	32 50.1	174.1	31 50.2	174.2	30 50.3	174.3	20
10	34 57.5	176.9	33 57.6	177.0	32 57.5	177.0	31 57.6	177.1	30 57.6	177.1	10
0 00	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 10	0 13.7	106.0									5 10
5 00	1 46.0	107.9	0 58.9	108.5	0 11.9	109.1					5 00
4 50	3 17.1	109.8	2 29.7	110.4	1 42.3	111.0	0 55.1	111.7	0 07.7	112.3	4 50
40	4 47.4	111.8	3 59.6	112.4	3 11.9	113.0	2 24.1	113.6	1 36.2	114.2	40
30	6 16.2	113.7	5 28.1	114.3	4 40.0	114.9	3 51.8	115.5	3 03.6	116.1	30
20	7 43.9	115.7	6 55.3	116.3	6 06.7	116.9	5 18.0	117.5	4 29.3	118.1	20
10	9 09.9	117.7	8 20.8	118.3	7 31.9	118.9	6 42.8	119.5	5 53.6	120.1	10
4 00	10 34.4	119.8	9 44.9	120.4	8 55.4	121.0	8 05.8	121.5	7 16.2	122.1	4 00
3 50	11 57.1	121.9	11 07.1	122.5	10 17.2	123.0	9 27.1	123.6	8 36.9	124.1	3 50
40	13 18.1	124.0	12 27.6	124.6	11 37.0	125.1	10 46.4	125.7	9 55.8	126.2	40
30	14 36.9	126.1	13 45.9	126.7	12 54.9	127.2	12 03.7	127.8	11 12.5	128.3	30
20	15 53.7	128.3	15 02.1	128.9	14 10.5	129.4	13 18.8	129.9	12 27.1	130.4	20
10	17 08.1	130.5	16 16.0	131.1	15 23.8	131.6	14 31.6	132.1	13 39.3	132.6	10
3 00	18 20.2	132.8	17 27.5	133.3	16 34.7	133.8	15 41.9	134.3	14 48.9	134.8	3 00
2 50	19 29.5	135.1	18 36.2	135.6	17 42.9	136.1	16 49.5	136.6	15 55.9	137.0	2 50
40	20 36.2	137.4	19 42.3	137.9	18 48.4	138.4	17 54.4	138.9	17 00.3	139.3	40
30	21 39.9	139.8	20 45.4	140.3	19 50.9	140.7	18 56.4	141.2	18 01.8	141.6	30
20	22 40.6	142.3	21 45.5	142.7	20 50.4	143.1	19 55.2	143.5	19 00.0	143.9	20
10	23 37.9	144.7	22 42.3	145.1	21 46.7	145.5	20 50.9	145.9	19 55.3	146.3	10
2 00	24 31.9	147.2	23 35.7	147.6	22 39.5	148.0	21 43.2	148.4	20 46.9	148.7	2 00
1 50	25 22.3	149.8	24 25.5	150.2	23 28.8	150.5	22 32.1	150.9	21 35.3	151.2	1 50
40	26 08.8	152.4	25 11.6	152.7	24 14.4	153.0	23 17.1	153.4	22 19.8	153.7	40
30	26 51.6	155.0	25 53.9	155.3	24 56.2	155.6	23 58.4	155.9	23 00.7	156.2	30
20	27 30.3	157.7	26 32.2	158.0	25 34.0	158.2	24 35.8	158.5	23 37.6	158.8	20
10	28 04.8	160.4	27 06.2	160.6	26 07.7	160.9	25 09.1	161.1	24 10.5	161.4	10
1 00	28 34.9	163.1	27 36.0	163.3	26 37.1	163.6	25 38.1	163.8	24 39.2	164.0	1 00
0 50	29 00.7	165.9	28 01.5	166.1	27 02.2	166.3	26 03.0	166.4	25 03.8	166.6	0 50
40	29 21.9	168.7	28 22.4	168.8	27 22.9	169.0	26 23.4	169.1	25 23.9	169.3	40
30	29 38.5	171.5	28 38.8	171.6	27 39.2	171.7	26 39.4	171.8	25 39.7	171.9	30
20	29 50.5	174.3	28 50.6	174.4	27 50.7	174.5	26 50.8	174.5	25 51.0	174.6	20
10	29 57.6	177.2	28 57.6	177.2	27 57.7	177.2	26 57.8	177.3	25 57.8	177.3	10
0 00	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	0 48.4	114.8	0 00.6	115.4							4 40
30	2 15.3	116.7	1 27.0	117.4	0 38.8	117.9					30
20	3 40.7	118.7	2 51.9	119.3	2 03.1	119.9	1 14.4	120.4	0 25.6	121.0	20
10	5 04.4	120.7	4 15.1	121.2	3 26.0	121.8	2 36.7	122.4	1 47.3	123.0	10
4 00	6 26.5	122.7	5 36.8	123.2	4 47.0	123.8	3 57.2	124.4	3 07.4	124.9	4 00
3 50	7 46.7	124.7	6 56.4	125.2	6 06.1	125.8	5 15.8	126.4	4 25.4	126.9	3 50
40	9 05.0	126.7	8 14.3	127.3	7 23.4	127.8	6 32.5	128.4	5 41.5	128.9	40
30	10 21.1	128.8	9 29.8	129.4	8 38.4	129.9	7 47.1	130.4	6 55.6	130.9	30
20	11 35.2	130.9	10 43.3	131.5	9 51.3	132.0	8 59.3	132.5	8 07.2	133.0	20
10	12 46.8	133.1	11 54.3	133.6	11 01.8	134.1	10 09.1	134.6	9 16.6	135.1	10
3 00	13 55.9	135.3	13 02.9	135.8	12 09.8	136.2	11 16.7	136.7	10 23.4	137.2	3 00
2 50	15 02.4	137.5	14 08.8	138.0	13 15.1	138.4	12 21.3	138.9	11 27.7	139.3	2 50
40	16 06.2	139.7	15 12.0	140.2	14 17.7	140.6	13 23.4	141.1	12 29.1	141.5	40
30	17 07.0	142.0	16 12.3	142.5	15 17.4	142.9	14 22.5	143.3	13 27.6	143.7	30
20	18 04.7	144.4	17 09.4	144.8	16 14.0	145.2	15 18.6	145.6	14 23.1	146.0	20
10	18 59.3	146.7	18 03.5	147.1	17 07.6	147.5	16 11.5	147.9	15 15.4	148.2	10
2 00	19 50.6	149.1	18 54.2	149.5	17 57.7	149.8	17 01.2	150.2	16 04.6	150.5	2 00
1 50	20 38.3	151.5	19 41.4	151.9	18 44.5	152.2	17 47.3	152.5	16 50.3	152.9	1 50
40	21 22.5	154.0	20 25.1	154.3	19 27.6	154.6	18 30.1	154.9	17 32.6	155.2	40
30	22 02.8	156.5	21 05.0	156.8	20 06.9	157.1	19 09.1	157.3	18 11.2	157.6	30
20	22 39.3	159.0	21 41.0	159.3	20 42.7	159.5	19 44.3	159.8	18 46.0	160.0	20
10	23 11.8	161.6	22 13.1	161.8	21 14.4	162.0	20 15.7	162.3	19 17.0	162.5	10
1 00	23 40.2	164.2	22 41.2	164.4	21 42.1	164.6	20 43.1	164.8	19 44.0	164.9	1 00
0 50	24 04.4	166.8	23 05.1	166.9	22 05.9	167.1	21 06.4	167.3	20 07.0	167.4	0 50
40	24 24.4	169.4	23 24.9	169.5	22 25.3	169.7	21 25.7	169.8	20 26.0	169.9	40
30	24 39.8	172.0	23 40.1	172.1	22 40.4	172.2	21 40.6	172.3	20 40.8	172.4	30
20	24 51.1	174.7	23 51.2	174.8	22 51.3	174.8	21 51.4	174.9	20 51.4	174.5	20
10	24 57.6	177.3	23 57.8	177.4	22 57.9	177.4	21 57.8	177.4	20 57.8	177.5	10
0 00	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 10	0 58.1	123.5	0 08.8	124.1							4 10
4 00	2 17.5	125.5	1 27.7	126.0	0 37.9	126.6					4 00
3 50	3 35.2	127.4	2 44.7	127.9	1 54.4	128.5	1 03.9	129.1	0 13.6	129.6	3 50
40	4 50.6	129.4	3 39.7	129.9	3 08.7	130.5	2 17.8	131.0	1 26.8	131.5	40
30	6 04.1	131.4	5 12.5	131.9	4 21.1	132.5	3 29.4	133.0	2 37.8	133.5	30
20	7 15.1	133.5	6 23.0	134.0	5 31.0	134.5	4 38.8	135.0	3 46.7	135.5	20
10	8 23.9	135.5	7 31.2	136.0	6 38.6	136.5	5 45.8	137.0	4 53.1	137.5	10
3 00	9 30.2	137.6	8 36.9	138.0	7 43.6	138.6	6 50.2	139.0	5 56.9	139.5	3 00
2 50	10 33.8	139.7	9 39.9	140.2	8 46.1	140.7	7 52.2	141.1	6 58.2	141.6	2 50
40	11 34.7	141.9	10 40.3	142.4	9 45.8	142.8	8 51.3	143.2	7 56.8	143.7	40
30	12 32.7	144.1	11 37.7	144.5	10 42.7	144.9	9 47.7	145.3	8 52.5	145.8	30
20	13 27.6	146.3	12 32.1	146.7	11 36.5	147.1	10 40.9	147.5	9 45.3	147.9	20
10	14 19.5	148.6	13 23.4	149.0	12 27.3	149.3	11 31.2	149.7	10 35.1	150.0	10
2 00	15 08.0	150.9	14 11.4	151.2	13 14.9	151.6	12 18.2	151.9	11 21.6	152.2	2 00
1 50	15 53.3	153.2	14 56.2	153.5	13 59.2	153.8	13 02.0	154.1	12 04.8	154.4	1 50
40	16 35.0	155.5	15 37.5	155.8	14 39.9	156.1	13 42.3	156.4	12 44.7	156.7	40
30	17 13.2	157.9	16 15.2	158.1	15 17.2	158.4	14 19.2	158.7	13 21.2	159.0	30
20	17 47.6	160.3	16 49.2	160.5	15 50.8	160.8	14 52.4	161.0	13 54.0	161.2	20
10	18 18.2	162.7	17 19.4	162.9	16 20.7	163.1	15 22.0	163.3	14 23.2	163.5	10
1 00	18 44.9	165.1	17 45.8	165.3	16 46.8	165.5	15 47.7	165.7	14 48.6	165.9	1 00
0 50	19 07.7	167.5	18 08.4	167.7	17 09.1	167.9	16 09.7	168.0	15 10.3	168.2	0 50
40	19 26.4	170.0	18 26.8	170.2	17 27.3	170.3	16 27.7	170.4	15 28.1	170.5	40
30	19 41.2	172.5	18 41.3	172.6	17 41.6	172.7	16 41.8	172.8	15 42.1	172.9	30
20	19 51.5	175.0	18 51.6	175.1	17 51.8	175.1	16 51.9	175.2	15 52.0	175.2	20
10	19 57.8	177.5	18 57.9	177.5	17 58.0	177.6	16 58.0	177.6	15 58.0	177.6	10
0 00	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabuiated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 10							0 45.7	86.2	1 32.2	85.5	6 10
6 00	0 00.0	90.0	0 46.7	89.4	1 33.3	88.8	2 19.9	88.1	3 06.5	87.5	6 00
5 50	1 34.4	91.9	2 21.1	91.3	3 07.7	90.7	3 54.3	90.1	4 40.8	89.4	5 50
40	3 08.6	93.9	3 55.3	93.3	4 42.0	92.6	5 28.7	92.0	6 15.2	91.4	40
30	4 42.7	95.8	5 29.4	95.2	6 16.2	94.5	7 02.9	93.9	7 49.6	93.3	30
20	6 16.4	97.8	7 03.3	97.2	7 50.1	96.5	8 36.9	95.9	9 23.6	95.3	20
10	7 49.7	99.8	8 36.8	99.1	9 23.7	98.5	10 10.8	97.9	10 57.5	97.3	10
5 00	9 22.4	101.8	10 09.7	101.1	10 56.9	100.5	11 44.0	99.9	12 30.9	99.3	5 00
4 50	10 54.5	103.8	11 42.0	103.2	12 29.4	102.5	13 16.6	101.9	14 03.8	101.3	4 50
40	12 25.8	105.8	13 13.5	105.2	14 01.1	104.6	14 48.7	103.9	15 36.1	103.3	40
30	13 56.1	107.8	14 44.1	107.2	15 32.0	106.6	16 19.8	106.0	17 07.4	105.3	30
20	15 25.5	109.9	16 13.8	109.3	17 02.1	108.7	17 50.2	108.1	18 38.1	107.4	20
10	16 53.6	112.0	17 42.2	111.4	18 30.8	110.8	19 19.2	110.2	20 07.6	109.5	10
4 00	18 20.4	114.2	19 09.5	113.6	19 58.5	113.0	20 47.3	112.3	21 35.9	111.7	4 00
3 50	19 45.7	116.4	20 35.2	115.8	21 24.6	115.2	22 13.9	114.5	23 02.9	113.9	3 50
40	21 09.6	118.6	21 49.5	118.0	22 49.3	117.4	23 39.0	116.7	24 28.5	116.1	40
30	22 31.5	120.8	23 22.0	120.2	24 12.3	119.6	25 02.4	119.0	25 52.5	118.4	30
20	23 51.6	123.1	24 42.6	122.5	25 33.4	121.9	26 24.1	121.3	27 14.6	120.7	20
10	25 09.6	125.5	26 01.1	124.9	26 52.4	124.3	27 43.6	123.7	28 34.7	123.1	10
3 00	26 25.4	127.9	27 17.4	127.3	28 09.2	126.7	29 00.9	126.2	29 52.6	125.6	3 00
2 50	27 38.6	130.3	28 31.2	129.8	29 23.7	129.2	30 16.0	128.7	31 08.1	128.1	2 50
40	28 49.3	132.8	29 42.4	132.3	30 35.5	131.7	31 28.4	131.2	32 21.1	130.6	40
30	29 57.1	135.4	30 50.9	134.9	31 44.5	134.3	32 38.0	133.8	33 31.3	133.2	30
20	31 01.9	138.0	31 56.3	137.5	32 50.5	137.0	33 44.6	136.5	34 38.6	135.9	20
10	32 03.4	140.7	32 58.3	140.2	33 53.2	139.7	34 48.0	139.2	35 42.6	138.7	10
2 00	33 01.5	143.4	33 57.1	142.9	34 52.5	142.5	35 47.9	142.0	36 43.2	141.5	2 00
1 50	33 55.9	146.2	34 52.2	145.8	35 48.2	145.3	36 44.2	144.9	37 40.1	144.4	1 50
40	34 46.5	149.1	35 43.3	148.7	36 39.9	148.2	37 36.5	147.8	38 32.9	147.4	40
30	35 32.9	152.0	36 30.2	151.6	37 27.5	151.2	38 24.7	150.8	39 21.8	150.4	30
20	36 15.2	154.9	37 13.1	154.6	38 10.8	154.2	39 08.5	153.9	40 06.1	153.5	20
10	36 53.0	157.9	37 51.2	157.6	38 49.6	157.3	39 47.8	157.0	40 45.8	156.7	10
1 00	37 26.1	161.0	38 24.8	160.7	39 23.5	160.4	40 22.2	160.2	41 20.8	159.9	1 00
0 50	37 54.5	164.1	38 53.6	163.9	39 52.6	163.6	40 51.8	163.4	41 50.8	163.2	0 50
40	38 18.0	167.2	39 17.3	167.1	40 16.7	166.9	41 16.1	166.7	42 15.4	166.5	40
30	38 36.3	170.4	39 35.9	170.3	40 35.6	170.1	41 35.2	170.0	42 34.8	169.8	30
20	38 49.4	173.6	39 49.3	173.5	40 49.1	173.4	41 49.0	173.3	42 48.8	173.2	20
10	38 57.4	176.8	39 57.2	176.7	40 57.2	167.7	41 57.2	176.6	42 57.2	176.6	10
0 00	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40									0 46.9	76.6	6 40
30					0 45.4	79.8	1 32.2	79.2	2 19.1	78.5	30
20	0 45.0	83.0	1 31.8	82.3	2 18.5	81.7	3 05.2	81.1	3 51.9	80.5	20
10	2 18.9	84.9	3 05.5	84.2	3 52.1	83.6	4 38.7	83.0	5 24.7	82.4	10
6 00	3 53.0	86.8	4 39.6	86.2	5 26.1	85.6	6 12.6	85.0	6 59.0	84.3	6 00
5 50	5 27.4	88.8	6 13.9	88.1	7 00.4	87.5	7 46.8	86.9	8 33.0	86.2	5 50
40	7 01.8	90.7	7 48.3	90.1	8 34.7	89.5	9 21.0	88.8	10 07.4	88.2	40
30	8 36.2	92.6	9 22.6	92.0	10 09.1	91.4	10 55.5	90.7	11 41.7	90.1	30
20	10 10.3	94.6	10 56.9	94.0	11 43.4	93.4	12 29.8	92.7	13 16.1	92.1	20
10	11 44.3	96.6	12 30.9	96.0	13 17.3	95.3	14 04.0	94.7	14 50.4	94.0	10
5 00	13 17.8	98.6	14 04.6	98.0	14 51.3	97.3	15 37.9	96.7	16 24.4	96.0	5 00
4 50	14 50.9	100.6	15 37.8	100.0	16 24.7	99.3	17 11.5	98.7	17 58.0	98.0	4 50
40	16 23.3	102.7	17 10.5	102.0	17 57.6	101.4	18 44.5	100.7	19 31.3	100.0	40
30	17 55.1	104.7	18 42.4	104.0	19 29.8	103.4	20 17.0	102.7	21 03.9	102.1	30
20	19 26.0	106.8	20 13.7	106.1	21 01.2	105.5	21 48.6	104.8	22 35.9	104.2	20
10	20 55.8	108.9	21 43.8	108.2	22 31.7	107.6	23 19.4	106.9	24 06.8	106.3	10
4 00	22 24.6	111.1	23 12.9	110.4	24 01.1	109.8	24 49.1	109.1	25 37.0	108.5	4 00
3 50	23 51.9	113.3	24 40.7	112.6	25 29.3	112.0	26 17.8	111.3	27 06.0	110.7	3 50
40	25 17.9	115.5	26 07.1	114.9	26 56.1	114.2	27 44.9	113.6	28 33.6	112.9	40
30	26 42.2	117.8	27 31.9	117.2	28 21.4	116.5	29 10.7	115.9	29 59.8	115.2	30
20	28 04.9	120.1	28 55.0	119.5	29 45.0	118.9	30 34.7	118.2	31 24.3	117.6	20
10	29 25.5	122.5	30 16.2	121.9	31 06.7	121.3	31 57.0	120.6	32 47.2	120.0	10
3 00	30 44.0	125.0	31 35.2	124.4	32 26.2	123.7	33 17.1	123.1	34 07.9	122.5	3 00
2 50	32 00.1	127.5	32 51.9	126.9	33 43.6	126.3	34 35.1	125.7	35 26.3	125.0	2 50
40	33 13.7	130.1	34 06.2	129.5	34 58.4	128.9	35 50.5	128.3	36 42.4	127.7	40
30	34 24.6	132.7	35 17.6	132.1	36 10.5	131.6	37 03.3	131.0	37 55.8	130.4	30
20	35 32.4	135.4	36 26.2	134.8	37 19.7	134.3	38 13.0	133.7	39 06.2	133.1	20
10	36 37.1	138.2	37 31.4	137.6	38 25.6	137.1	39 19.7	136.6	40 13.5	136.0	10
2 00	37 38.3	141.0	38 33.3	140.5	39 28.1	140.0	40 22.8	139.5	41 17.4	138.9	2 00
1 50	38 35.8	144.0	39 31.3	143.5	40 26.9	143.0	41 22.3	142.5	42 17.5	142.0	1 50
40	39 29.3	147.0	40 25.5	146.5	41 21.7	146.1	42 17.8	145.6	43 13.7	145.1	40
30	40 18.7	150.0	41 15.5	149.6	42 12.4	149.2	43 09.1	148.7	44 05.5	148.3	30
20	41 03.6	153.1	42 01.1	152.8	42 58.5	152.4	43 55.8	151.9	44 53.0	151.5	20
10	41 43.9	156.3	42 41.9	156.0	43 39.8	155.6	44 37.8	155.3	45 35.5	154.9	10
1 00	42 19.3	159.6	43 17.8	159.3	44 16.3	159.0	45 14.6	158.7	46 13.0	158.3	1 00
0 50	42 49.7	162.9	43 48.6	162.6	44 47.5	162.4	45 46.4	162.1	46 45.1	161.8	0 50
40	43 14.7	166.3	44 14.1	166.1	45 13.3	165.8	46 12.6	165.6	47 11.8	165.4	40
30	43 34.5	169.7	44 34.0	169.5	45 33.7	169.3	46 33.3	169.2	47 32.8	169.0	30
20	43 48.6	173.1	44 48.4	173.0	45 48.2	172.9	46 48.0	172.8	47 47.8	172.6	20
10	43 57.1	176.5	44 57.1	176.5	45 57.0	176.4	46 57.0	176.4	47 57.0	176.3	10
0 00	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10									0 15.1	67.7	7 10
7 00					0 07.8	70.9	0 55.4	70.3	1 43.0	69.7	7 00
6 50	0 02.6	74.0	0 50.1	73.4	1 37.4	72.8	2 24.8	72.2	3 12.1	71.6	6 50
40	1 34.0	76.0	2 21.1	75.4	3 08.1	74.7	3 55.0	74.1	4 42.1	73.5	40
30	3 05.9	77.9	3 52.7	77.3	4 39.5	76.7	5 26.4	76.0	6 13.1	75.4	30
20	4 38.6	79.8	5 25.2	79.2	6 11.7	78.6	6 58.3	77.9	7 44.8	77.3	20
10	6 18.6	81.7	6 58.1	81.1	7 44.6	80.5	8 31.0	79.8	9 17.3	79.2	10
6 00	7 45.4	83.7	8 31.7	83.0	9 17.9	82.4	10 04.1	81.8	10 50.2	81.1	6 00
5 50	9 19.3	85.6	10 05.6	84.9	10 51.6	84.3	11 37.8	83.7	12 23.8	83.0	5 50
40	10 53.6	87.5	11 39.8	86.9	12 25.8	86.2	13 11.8	85.6	13 57.6	84.9	40
30	12 27.8	89.4	13 13.9	88.8	14 00.0	88.1	14 46.0	87.5	15 31.7	86.8	30
20	14 02.3	91.4	14 48.4	90.7	15 34.4	90.1	16 20.3	89.4	17 06.1	88.7	20
10	15 36.6	93.3	16 22.8	92.7	17 08.8	92.0	17 54.8	91.3	18 40.4	90.6	10
5 00	17 10.7	95.3	17 57.0	94.7	18 43.0	94.0	19 29.0	93.3	20 14.8	92.6	5 00
4 50	18 44.5	97.3	19 30.9	96.7	20 17.1	96.0	21 03.1	95.3	21 49.0	94.6	4 50
40	20 17.9	99.4	21 04.5	98.7	21 50.8	98.0	22 36.9	97.3	23 22.9	96.6	40
30	21 50.8	101.4	22 37.4	100.7	23 24.0	100.0	24 10.3	99.3	24 56.4	98.6	30
20	23 23.0	103.5	24 09.9	102.8	24 56.6	102.1	25 43.2	101.4	26 29.5	100.7	20
10	24 54.2	105.6	25 41.5	104.9	26 28.5	104.2	27 15.3	103.5	28 01.9	102.8	10
4 00	26 24.7	107.8	27 12.3	107.1	27 59.6	106.4	28 46.7	105.7	29 33.6	105.0	4 00
3 50	27 54.1	110.0	28 41.9	109.3	29 29.6	108.6	30 17.1	107.9	31 04.3	107.2	3 50
40	29 22.1	112.2	30 10.4	111.6	30 58.5	110.9	31 46.3	110.2	32 33.9	109.4	40
30	30 48.7	114.5	31 37.4	113.9	32 26.0	113.2	33 04.3	112.5	34 02.3	111.7	30
20	32 13.8	116.9	33 03.1	116.2	33 52.0	115.5	34 40.8	114.8	35 29.3	114.1	20
10	33 37.0	119.3	34 26.8	118.7	35 16.3	118.0	36 05.6	117.3	36 54.5	116.6	10
3 00	34 58.4	121.8	35 48.7	121.2	36 38.7	120.5	37 28.5	119.8	38 18.1	119.1	3 00
2 50	36 17.4	124.4	37 08.3	123.7	37 58.9	123.0	38 49.4	122.4	39 39.6	121.7	2 50
40	37 34.1	127.0	38 25.6	126.4	39 16.9	125.7	40 07.9	125.0	40 58.7	124.3	40
30	38 48.1	129.7	39 40.3	129.1	40 32.2	128.5	41 24.0	127.8	42 15.4	127.1	30
20	39 59.3	132.5	40 52.1	131.9	41 44.7	131.3	42 37.1	130.6	43 29.3	129.9	20
10	41 07.2	135.4	42 00.8	134.8	42 54.1	134.2	43 47.3	133.5	44 40.1	132.9	10
2 00	42 11.8	138.4	43 06.0	137.8	44 00.1	137.2	44 54.0	136.6	45 47.6	135.9	2 00
1 50	43 12.6	141.4	44 07.5	140.8	45 02.3	140.3	45 57.0	139.7	46 51.4	139.1	1 50
40	44 09.5	144.5	45 05.1	144.0	46 00.7	143.5	46 56.0	142.9	47 51.2	142.3	40
30	45 02.0	147.8	45 58.4	147.3	46 54.6	146.8	47 50.8	146.3	48 46.7	145.7	30
20	45 50.1	151.1	46 47.1	150.6	47 44.0	150.2	48 40.8	149.7	49 37.5	149.2	20
10	46 33.2	154.5	47 30.9	154.1	48 28.5	153.7	49 26.0	153.2	50 23.3	152.8	10
1 00	47 11.3	158.0	48 09.5	157.6	49 07.6	157.2	50 05.7	156.8	51 03.8	156.4	1 00
0 50	47 43.9	161.5	48 42.7	161.2	49 41.3	160.9	50 40.0	160.6	51 38.7	160.2	0 50
40	48 11.0	165.2	49 10.2	164.9	50 09.6	164.6	51 08.6	164.4	52 07.6	164.1	40
30	48 32.3	168.8	49 31.9	168.6	50 31.4	168.4	51 30.9	168.2	52 30.4	168.0	30
20	48 47.6	172.5	49 47.5	172.4	50 47.3	172.3	51 47.0	172.1	52 46.8	172.0	20
10	48 56.9	176.2	49 56.9	176.2	50 56.8	176.1	51 56.8	176.0	52 56.8	176.0	10
0 00	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40									0 05.3	59.0	7 40
30							0 38.3	61.5	1 27.0	60.9	30
20			0 25.1	64.6	1 13.5	64.0	2 01.9	63.4	2 50.2	62.8	20
10	1 03.1	67.1	1 51.1	66.5	2 39.0	65.9	3 27.0	65.3	4 14.9	64.7	10
7 00	2 30.6	69.0	3 18.2	68.4	4 05.8	67.8	4 53.4	67.2	5 40.9	66.6	7 00
6 50	3 59.4	71.0	4 46.7	70.3	5 33.8	69.7	6 21.1	69.1	7 08.1	68.5	6 50
40	5 29.1	72.9	6 16.0	72.2	7 02.9	71.6	7 49.8	71.0	8 36.6	70.4	40
30	6 59.8	74.8	7 46.4	74.1	8 32.9	73.5	9 19.4	72.8	10 05.9	72.2	30
20	8 31.2	76.6	9 17.5	76.0	10 03.9	75.4	10 50.2	74.7	11 36.4	74.1	20
10	10 03.4	78.5	10 49.7	77.9	11 35.6	77.3	12 21.7	76.6	13 07.4	75.9	10
6 00	11 36.2	80.4	12 22.2	79.8	13 08.0	79.2	13 53.7	78.5	14 39.4	77.8	6 00
5 50	13 09.5	82.3	13 55.4	81.6	14 40.9	81.0	15 26.5	80.3	16 11.9	79.6	5 50
40	14 33.4	84.2	15 29.0	83.5	16 14.5	82.9	16 59.9	82.2	17 45.1	81.5	40
30	16 17.5	86.2	17 02.9	85.5	17 48.3	84.8	18 33.6	84.1	19 18.5	83.4	30
20	17 51.7	88.1	18 37.2	87.4	19 22.5	86.7	20 07.6	86.0	20 52.6	85.3	20
10	19 26.1	90.0	20 11.4	89.3	20 56.8	88.6	21 41.8	87.9	22 26.7	87.2	10
5 00	21 00.4	92.0	21 45.9	91.3	22 31.1	90.5	23 16.2	89.8	24 01.2	89.1	5 00
4 50	22 34.7	93.9	23 20.1	93.2	24 05.4	92.5	24 50.6	91.7	25 35.4	91.0	4 50
40	24 08.8	95.9	24 54.3	95.2	25 39.7	94.5	26 24.9	93.7	27 09.8	93.0	40
30	25 42.4	97.9	26 28.1	97.2	27 13.8	96.5	27 58.9	95.7	28 43.8	95.0	30
20	27 15.7	100.0	28 01.6	99.3	28 47.3	98.5	29 32.7	97.8	30 17.9	97.0	20
10	28 48.3	102.1	29 34.4	101.4	30 20.3	100.6	31 05.9	99.9	31 51.2	99.1	10
4 00	30 20.2	104.3	31 06.6	103.5	31 52.8	102.8	32 38.6	102.0	33 24.2	101.2	4 00
3 50	31 51.3	106.5	32 38.0	105.7	33 24.3	105.0	34 10.6	104.2	34 56.4	103.4	3 50
40	33 21.3	108.7	34 08.4	107.9	34 55.1	107.2	35 41.6	106.4	36 27.9	105.6	40
30	34 50.0	111.0	35 37.5	110.2	36 24.7	109.5	37 11.7	108.7	37 58.2	107.9	30
20	36 17.5	113.4	37 05.4	112.6	37 53.1	111.8	38 40.4	111.1	39 27.4	110.3	20
10	37 43.3	115.8	38 31.8	115.1	39 19.8	114.3	40 07.8	113.5	40 55.2	112.7	10
3 00	39 07.4	118.3	39 56.4	117.6	40 45.1	116.8	41 33.5	116.0	42 21.5	115.2	3 00
2 50	40 29.4	120.9	41 19.0	120.2	42 08.3	119.4	42 57.3	118.6	43 45.9	117.8	2 50
40	41 49.3	123.6	42 39.5	122.8	43 29.5	122.1	44 19.1	121.3	45 08.4	120.5	40
30	43 05.6	126.4	43 57.7	125.6	44 48.3	124.9	45 38.5	124.1	46 28.5	123.3	30
20	44 21.3	129.2	45 12.9	128.5	46 04.3	127.8	46 55.4	127.0	47 46.2	126.2	20
10	45 32.8	132.2	46 25.3	131.5	47 17.4	130.8	48 09.3	130.0	49 00.7	129.2	10
2 00	46 41.1	135.2	47 34.3	134.6	48 27.2	133.9	49 19.9	133.1	50 12.3	132.4	2 00
1 50	47 45.7	138.4	48 39.6	137.8	49 33.4	137.1	50 27.0	136.4	51 20.1	135.7	1 50
40	48 46.3	141.7	49 41.1	141.1	50 35.7	140.5	51 30.0	139.8	52 24.2	139.1	40
30	49 42.4	145.2	50 38.1	144.6	51 33.5	144.0	52 28.7	143.3	53 23.5	142.6	30
20	50 34.0	148.7	51 30.4	148.1	52 26.6	147.6	53 22.7	147.0	54 18.6	146.4	20
10	51 20.6	152.3	52 17.6	151.8	53 14.6	151.3	54 11.5	150.7	55 08.1	150.2	10
1 00	52 01.7	156.0	52 59.5	155.6	53 57.2	155.1	54 54.8	154.7	55 52.3	154.1	1 00
0 50	52 37.0	159.9	53 35.6	159.5	54 33.9	159.1	55 32.1	158.7	56 30.3	158.2	0 50
40	53 06.6	163.8	54 05.6	163.5	55 04.5	163.1	56 03.4	162.8	57 02.2	162.4	40
30	53 29.8	167.8	54 29.3	167.5	55 28.7	167.3	56 28.0	167.0	57 27.1	168.8	30
20	53 46.6	171.8	54 46.3	171.7	55 46.0	171.5	56 45.7	171.3	57 45.4	171.1	20
10	53 56.7	175.9	54 56.7	175.8	55 56.5	175.7	56 56.5	175.6	57 56.4	175.5	10
0 00	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00							0 48.2	52.9	1 38.5	52.3	8 00
7 50			0 24.8	55.9	1 14.6	55.4	2 04.3	54.8	2 54.1	54.2	7 50
40	0 54.6	58.4	1 43.9	57.8	2 33.1	57.3	3 22.4	56.7	4 11.6	56.1	40
30	2 15.7	60.3	3 04.6	59.8	3 53.4	59.2	4 42.1	58.6	5 30.8	58.0	30
20	3 38.6	62.2	4 27.0	61.6	5 15.2	61.1	6 03.5	60.5	6 51.7	59.9	20
10	5 02.7	64.1	5 50.7	63.5	6 38.5	62.9	7 26.2	62.3	8 14.1	61.7	10
7 00	6 28.4	66.0	7 15.9	65.4	8 03.3	64.8	8 50.6	64.1	9 37.9	63.5	7 00
6 50	7 55.2	67.8	8 42.2	67.2	9 29.2	66.6	10 16.2	66.0	11 03.0	65.4	6 50
40	9 23.3	69.7	10 10.0	69.1	10 56.6	68.4	11 43.1	67.8	12 29.4	67.2	40
30	10 52.2	71.5	11 38.6	70.9	12 24.8	70.2	13 10.9	69.6	13 53.9	69.0	30
20	12 22.4	73.4	13 08.4	72.8	13 54.2	72.1	14 39.9	71.4	15 25.5	70.8	20
10	13 53.2	75.2	14 38.9	74.6	15 24.4	73.9	16 02.7	73.2	16 55.2	72.6	10
6 00	15 24.9	77.1	16 10.3	76.4	16 55.5	75.7	17 40.7	75.0	18 25.6	74.3	6 00
5 50	16 57.2	78.9	17 42.3	78.2	18 27.3	77.5	19 12.2	76.8	19 56.9	76.1	5 50
40	18 30.1	80.8	19 15.0	80.1	19 59.8	79.4	20 44.5	78.7	21 28.9	78.0	40
30	20 03.4	82.6	20 48.2	81.9	21 32.8	81.2	22 17.2	80.5	23 01.5	79.8	30
20	21 37.4	84.5	22 22.0	83.8	23 06.4	83.1	23 50.7	82.4	24 34.7	81.6	20
10	23 11.4	86.4	23 55.9	85.7	24 40.3	85.0	25 24.4	84.2	26 08.2	83.5	10
5 00	24 45.8	88.4	25 30.3	87.6	26 14.5	86.9	26 58.5	86.1	27 42.2	85.3	5 00
4 50	26 20.1	90.3	27 04.6	89.5	27 48.8	88.8	28 32.7	88.0	29 16.4	87.2	4 50
40	27 54.5	92.2	28 39.0	91.5	29 23.2	90.7	30 07.1	89.9	30 50.8	89.1	40
30	29 28.7	94.2	30 13.2	93.5	30 57.5	92.7	31 41.5	91.9	32 25.1	91.1	30
20	31 02.8	96.3	31 47.4	95.5	32 31.7	94.7	33 15.8	93.9	33 59.5	93.1	20
10	32 36.3	98.3	33 21.2	97.5	34 05.6	96.7	34 49.7	95.9	35 33.5	95.1	10
4 00	34 09.5	100.4	34 54.5	99.6	35 39.2	98.8	36 23.5	98.0	37 07.4	97.2	4 00
3 50	35 42.0	102.6	36 27.2	101.8	37 12.2	101.0	37 56.7	100.1	38 40.8	99.3	3 50
40	37 13.8	104.8	37 59.3	104.0	38 44.5	103.2	39 29.4	102.3	40 13.8	101.5	40
30	38 44.5	107.1	39 30.3	106.3	40 16.0	105.5	41 01.1	104.6	41 45.9	103.7	30
20	40 14.1	109.4	41 00.4	108.6	41 46.4	107.8	42 32.0	106.9	43 17.2	106.0	20
10	41 42.4	111.9	42 29.2	111.0	43 15.7	110.2	44 01.7	109.3	44 47.3	108.4	10
3 00	43 09.2	114.4	43 56.5	113.5	44 43.6	112.7	45 30.1	111.8	46 16.2	110.9	3 00
2 50	44 34.2	117.0	45 22.3	116.1	46 09.8	115.3	46 56.9	114.4	47 43.7	113.5	2 50
40	45 57.4	119.7	46 46.0	118.8	47 36.2	118.0	48 22.0	117.1	49 09.4	116.2	40
30	47 18.2	122.5	48 07.5	121.6	48 56.5	120.8	49 45.0	119.9	50 33.1	119.0	30
20	48 36.6	125.4	49 26.7	124.6	50 16.4	123.7	51 05.8	122.8	51 54.6	121.9	20
10	49 52.0	128.4	50 43.0	127.6	51 33.5	126.8	52 23.6	125.9	53 13.3	125.0	10
2 00	51 04.4	131.6	51 56.1	130.8	52 47.5	129.9	53 38.6	129.1	54 29.2	128.2	2 00
1 50	52 13.0	134.9	53 05.8	134.1	53 58.1	133.3	54 50.0	132.4	55 41.6	131.5	1 50
40	53 18.0	138.4	54 11.5	137.6	55 04.8	136.8	55 57.8	136.0	56 50.3	135.1	40
30	54 18.3	142.0	55 12.9	141.3	56 07.1	140.5	57 01.1	139.7	57 54.7	138.8	30
20	55 14.2	145.7	56 09.6	145.0	57 04.8	144.3	57 59.8	143.6	58 54.4	142.8	20
10	56 04.6	149.6	57 01.0	149.0	57 57.2	148.3	58 53.1	147.6	59 48.9	146.9	10
1 00	56 49.6	153.6	57 46.8	153.1	58 43.8	152.5	59 40.7	151.9	60 37.4	151.2	1 00
0 50	57 28.5	157.8	58 26.5	157.3	59 24.2	156.8	60 22.0	156.3	61 19.6	155.7	0 50
40	58 00.9	162.1	58 59.5	161.7	59 58.1	161.2	60 56.6	160.8	61 55.0	160.4	40
30	58 26.5	166.5	59 25.6	166.1	60 24.9	165.8	61 24.0	165.5	62 23.1	165.1	30
20	58 45.1	170.9	59 44.7	170.7	60 44.3	170.5	61 43.9	170.3	62 43.5	170.0	20
10	58 56.2	175.4	59 56.1	175.3	60 56.0	175.2	61 56.0	175.1	62 55.9	175.0	10
0 00	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	1 34. 4	91. 9	0 47. 8	92. 6	0 01. 1	93. 2					5 50
40	3 08. 6	93. 9	2 22. 0	94. 5	1 35. 2	95. 1	0 48. 5	95. 8	0 01. 8	96. 4	40
30	4 42. 7	95. 8	3 55. 9	96. 5	3 09. 0	97. 1	2 22. 2	97. 8	1 35. 4	98. 4	30
20	6 16. 4	97. 8	5 29. 5	98. 4	4 42. 5	99. 1	3 55. 5	99. 7	3 08. 5	100. 3	20
10	7 49. 7	99. 8	7 02. 7	100. 4	6 15. 5	101. 0	5 28. 3	101. 6	4 41. 1	102. 3	10
5 00	9 22. 4	101. 8	8 35. 2	102. 4	7 47. 8	103. 0	7 00. 4	103. 6	6 13. 0	104. 3	5 00
4 50	10 54. 5	103. 8	10 07. 0	104. 4	9 19. 4	105. 0	8 31. 7	105. 6	7 44. 1	106. 3	4 50
40	12 25. 8	105. 8	11 38. 0	106. 4	10 50. 1	107. 0	10 02. 2	107. 6	9 14. 2	108. 3	40
30	13 56. 1	107. 8	13 08. 0	108. 4	12 19. 9	109. 0	11 31. 6	109. 6	10 43. 2	110. 3	30
20	15 25. 5	109. 9	14 37. 1	110. 5	13 48. 6	111. 1	13 00. 0	111. 7	12 11. 3	112. 3	20
10	16 53. 6	112. 0	16 04. 8	112. 6	15 15. 9	113. 2	14 26. 9	113. 8	13 37. 9	114. 4	10
4 00	18 20. 4	114. 2	17 31. 3	114. 8	16 42. 0	115. 4	15 52. 6	116. 0	15 03. 1	116. 5	4 00
3 50	19 45. 7	116. 4	18 56. 2	116. 9	18 06. 4	117. 5	17 16. 7	118. 1	16 26. 8	118. 7	3 50
40	21 09. 6	118. 6	20 19. 5	119. 1	19 29. 3	119. 7	18 39. 0	120. 3	17 48. 6	120. 9	40
30	22 31. 5	120. 8	21 41. 1	121. 4	20 50. 4	122. 0	19 59. 6	122. 5	19 08. 8	123. 1	30
20	23 51. 6	123. 1	23 00. 7	123. 7	22 09. 5	124. 3	21 18. 2	124. 8	20 26. 8	125. 4	20
10	25 09. 6	125. 5	24 18. 1	126. 0	23 26. 4	126. 6	22 34. 5	127. 1	21 42. 8	127. 7	10
3 00	26 25. 4	127. 9	25 33. 3	128. 4	24 41. 1	129. 0	23 48. 6	129. 5	22 56. 2	130. 0	3 00
2 50	27 38. 6	130. 3	26 45. 9	130. 8	25 53. 2	131. 4	25 00. 2	131. 9	24 07. 2	132. 4	2 50
40	28 49. 3	132. 8	27 56. 1	133. 3	27 02. 7	133. 9	26 09. 2	134. 4	25 15. 5	134. 9	40
30	29 57. 1	135. 4	29 03. 2	135. 9	28 09. 3	136. 4	27 15. 1	136. 8	26 20. 9	137. 3	30
20	31 01. 9	138. 0	30 07. 4	138. 5	29 12. 8	139. 0	28 18. 2	139. 4	27 23. 4	139. 9	20
10	32 03. 4	140. 7	31 08. 3	141. 1	30 13. 2	141. 6	29 17. 9	142. 0	28 22. 6	142. 5	10
2 00	33 01. 5	143. 4	32 05. 9	143. 8	31 10. 1	144. 3	30 14. 3	144. 7	29 18. 4	145. 1	2 00
1 50	33 55. 9	146. 2	32 59. 8	146. 6	32 03. 4	147. 0	31 07. 0	147. 4	30 10. 6	147. 8	1 50
40	34 46. 5	149. 1	33 49. 8	149. 4	32 52. 9	149. 8	31 55. 9	150. 2	30 58. 9	150. 6	40
30	35 32. 9	152. 0	34 35. 7	152. 3	33 38. 2	152. 7	32 40. 8	153. 0	31 43. 3	153. 4	30
20	36 15. 2	154. 9	35 17. 4	155. 2	34 19. 6	155. 6	33 21. 6	155. 9	32 23. 6	156. 2	20
10	36 53. 0	157. 9	35 54. 8	158. 2	34 56. 4	158. 5	33 57. 9	158. 8	32 59. 5	159. 1	10
1 00	37 26. 1	161. 0	36 27. 4	161. 2	35 28. 7	161. 5	34 29. 9	161. 7	33 31. 1	162. 0	1 00
0 50	37 54. 5	164. 1	36 55. 4	164. 3	35 56. 2	164. 5	34 57. 1	164. 7	33 57. 9	164. 9	0 50
40	38 18. 0	167. 2	37 18. 5	167. 4	36 19. 0	167. 6	35 19. 6	167. 7	34 20. 1	167. 9	40
30	38 36. 3	170. 4	37 36. 6	170. 5	36 36. 9	170. 6	35 37. 2	170. 7	34 37. 5	170. 9	30
20	38 49. 4	173. 6	37 49. 6	173. 7	36 49. 8	173. 8	35 49. 9	173. 8	34 50. 0	173. 9	20
10	38 51. 4	176. 8	37 57. 4	176. 8	36 57. 4	176. 9	35 57. 4	176. 9	34 57. 5	176. 9	10
0 00	39 0. 0	180. 0	38 0. 0	180 0	37 0. 0	180. 0	36 0. 0	180. 0	35 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 48.6	99.0	0 01.6	99.6							5 30
20	2 21.4	100.9	1 34.3	101.6	0 47.3	102.2	0 00.2	102.8			20
10	3 53.9	102.9	3 10.6	103.5	2 19.0	104.1	1 31.9	104.7	0 44.6	105.3	10
5 00	5 25.5	104.9	4 37.9	105.5	3 50.4	106.1	3 02.8	106.7	2 15.2	107.3	5 00
4 50	6 56.3	106.9	6 08.4	107.5	5 20.6	108.1	4 32.7	108.7	3 44.7	109.3	4 50
40	8 26.1	108.9	7 38.0	109.5	6 49.8	110.1	6 01.5	110.7	5 13.3	111.3	40
30	9 54.9	110.9	9 06.4	111.5	8 17.9	112.1	7 29.4	112.7	6 40.7	113.3	30
20	11 22.5	112.9	10 33.6	113.5	9 44.7	114.1	8 55.8	114.7	8 06.8	115.3	20
10	12 48.8	115.0	11 59.6	115.6	11 10.2	116.2	10 20.8	116.8	9 31.3	117.3	10
4 00	14 13.6	117.1	13 23.8	117.7	12 34.1	118.3	11 44.3	118.9	10 54.4	119.4	4 00
3 50	15 36.7	119.3	14 46.6	119.8	13 56.4	120.4	13 06.2	121.0	12 15.8	121.5	3 50
40	16 58.1	121.5	16 07.6	122.0	15 16.9	122.6	14 26.2	123.1	13 35.4	123.7	40
30	18 17.8	123.7	17 26.7	124.2	16 35.5	124.8	15 44.2	125.3	14 52.9	125.9	30
20	19 45.3	125.9	18 43.7	126.5	17 52.0	127.0	17 00.2	127.5	16 08.3	128.1	20
10	20 50.6	128.2	19 58.5	128.7	19 06.2	129.3	18 13.9	129.8	17 21.6	130.3	10
3 00	22 03.6	130.5	21 10.9	131.1	20 18.1	131.6	19 25.2	132.1	18 32.3	132.6	3 00
2 50	23 14.0	132.9	22 20.8	133.4	21 27.4	133.9	20 34.0	134.4	19 40.6	134.9	2 50
40	24 21.8	135.4	23 28.0	135.8	22 34.1	136.3	21 40.1	136.8	20 46.0	137.3	40
30	25 26.7	137.8	24 32.3	138.3	23 37.8	138.7	22 43.3	139.2	21 48.7	139.7	30
20	26 28.6	140.4	25 33.6	140.8	24 38.6	141.2	23 43.5	141.7	22 48.3	142.1	20
10	27 27.2	142.9	26 31.6	143.3	25 36.1	143.7	24 40.4	144.2	23 44.7	144.6	10
2 00	28 22.4	145.5	27 26.3	145.9	26 30.1	146.3	25 33.9	146.7	24 37.7	147.1	2 00
1 50	29 14.0	148.2	28 17.3	148.6	27 20.7	148.9	26 23.9	149.3	25 27.2	149.7	1 50
40	30 01.8	150.9	29 04.7	151.3	28 07.5	151.6	27 10.2	152.0	26 13.0	152.3	40
30	30 45.8	153.7	29 48.1	154.0	28 50.5	154.3	27 52.8	154.6	26 54.9	154.9	30
20	31 25.5	156.5	30 27.4	156.8	29 29.3	157.1	28 31.1	157.3	27 32.9	157.6	20
10	32 01.1	159.3	31 02.6	159.6	30 04.0	159.9	29 05.5	160.1	28 06.9	160.3	10
1 00	32 32.2	162.2	31 33.3	162.4	30 34.3	162.7	29 35.4	162.9	28 36.4	163.1	1 00
0 50	32 58.8	165.1	31 59.5	165.3	31 00.2	165.5	30 01.0	165.7	29 01.8	165.9	0 50
40	33 20.6	168.1	32 21.2	168.2	31 21.7	168.4	30 22.2	168.5	29 22.7	168.7	40
30	33 37.8	171.0	32 38.1	171.1	31 38.4	171.2	30 38.7	171.3	29 38.9	171.5	30
20	33 50.1	174.0	32 50.3	174.1	31 50.4	174.2	30 50.5	174.2	29 50.6	174.3	20
10	33 57.6	177.0	32 57.6	177.0	31 57.6	177.1	30 57.6	177.1	29 57.7	177.1	10
0 00	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 27.6	107.9	0 39.9	108.5							5 00
4 50	2 56.8	109.9	2 08.9	110.5	1 20.9	111.1	0 32.9	111.7			4 50
40	4 25.1	111.9	3 36.7	112.5	2 48.4	113.1	2 00.1	113.6	1 11.7	114.2	40
30	5 52.0	113.9	5 03.3	114.5	4 14.6	115.0	3 25.8	115.6	2 37.0	116.2	30
20	7 17.8	115.9	6 28.7	116.5	5 39.5	117.0	4 50.3	117.6	4 01.1	118.2	20
10	8 41.8	117.9	7 52.3	118.5	7 02.7	119.0	6 13.1	119.6	5 23.4	120.2	10
4 00	10 04.5	120.0	9 14.5	120.6	8 24.5	121.1	7 34.4	121.7	6 44.3	122.2	4 00
3 50	11 25.4	122.1	10 34.9	122.7	9 44.4	123.2	8 53.8	123.7	8 03.1	124.2	3 50
40	12 44.4	124.2	11 53.5	124.8	11 02.4	125.3	10 11.4	125.8	9 20.3	126.3	40
30	14 01.4	126.4	13 10.0	126.9	12 18.5	127.4	11 26.9	127.9	10 35.1	128.4	30
20	15 16.3	128.6	14 24.4	129.1	13 32.3	129.6	12 40.2	130.1	11 48.1	130.6	20
10	16 29.0	130.8	15 36.6	131.3	14 44.0	131.8	13 51.3	132.3	12 58.5	132.8	10
3 00	17 39.3	133.1	16 46.2	133.5	15 53.1	134.0	14 59.9	134.5	14 06.6	135.0	3 00
2 50	18 46.9	135.4	17 53.4	135.8	16 59.6	136.3	16 05.9	136.8	15 12.1	137.2	2 50
40	19 51.9	137.7	18 57.7	138.1	18 03.5	138.6	17 09.2	139.1	16 14.8	139.5	40
30	20 53.9	140.1	19 59.2	140.5	19 04.5	140.9	18 09.7	141.4	17 14.6	141.8	30
20	21 53.1	142.5	20 57.7	142.9	20 02.4	143.3	19 06.9	143.7	18 11.5	144.1	20
10	22 48.8	145.0	21 53.1	145.4	20 57.2	145.7	20 01.1	146.1	19 05.1	146.5	10
2 00	23 41.4	147.5	22 45.0	147.9	21 48.6	148.2	20 52.1	148.6	19 55.6	148.9	2 00
1 50	24 30.3	150.0	23 33.5	150.4	22 36.5	150.7	21 39.6	151.1	20 42.5	151.4	1 50
40	25 15.6	152.6	24 18.3	152.9	23 20.9	153.3	22 23.5	153.6	21 26.0	153.9	40
30	25 57.2	155.2	24 59.4	155.5	24 01.5	155.8	23 03.7	156.1	22 05.7	156.4	30
20	26 34.7	157.9	25 36.5	158.1	24 38.2	158.4	23 39.9	158.7	22 41.6	158.9	20
10	27 08.2	160.6	26 09.7	160.8	25 11.0	161.0	24 12.3	161.3	23 13.6	161.5	10
1 00	27 37.5	163.3	26 38.5	163.5	25 39.5	163.7	24 40.5	163.9	23 41.5	164.1	1 00
0 50	28 02.5	166.0	27 03.3	166.2	26 03.9	166.4	25 04.7	166.5	24 05.3	166.7	0 50
40	28 23.1	168.8	27 23.6	168.9	26 24.1	169.1	25 24.5	169.2	24 25.0	169.3	40
30	28 39.3	171.6	27 39.5	171.7	26 39.8	171.8	25 39.9	171.9	24 40.3	171.9	30
20	28 50.8	174.4	27 50.9	174.4	26 51.0	174.5	25 51.1	174.6	24 51.3	174.6	20
10	28 57.7	177.2	27 57.8	177.2	26 57.8	177.2	25 57.8	177.3	24 57.8	177.3	10
0 00	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt,	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	0 23.3	114.8									4 40
30	1 48.3	116.8	0 59.5	117.4	0 10.6	117.9					30
20	3 11.9	118.7	2 22.6	119.3	1 33.3	119.9	0 44.0	120.5			20
10	4 33.8	120.7	3 44.0	121.3	2 54.3	121.9	2 04.5	122.4	1 14.7	123.0	10
4 00	5 54.1	122.8	5 03.9	123.3	4 13.6	123.9	3 23.3	124.4	2 33.1	125.0	4 00
3 50	7 12.5	124.8	6 21.8	125.3	5 30.9	125.9	4 40.1	126.4	3 49.5	127.0	3 50
40	8 29.1	126.9	7 37.9	127.4	6 46.5	127.9	5 55.2	128.4	5 03.9	129.0	40
30	9 43.5	129.0	8 51.8	129.5	7 59.9	130.0	7 08.1	130.5	6 16.2	131.0	30
20	10 55.8	131.1	10 03.5	131.6	9 11.2	132.1	8 18.8	132.6	7 26.3	133.1	20
10	12 05.8	133.2	11 12.9	133.7	10 19.9	134.2	9 27.1	134.7	8 34.1	135.2	10
3 00	13 13.2	135.4	12 19.9	135.9	11 26.4	136.4	10 32.9	136.8	9 39.4	137.3	3 00
2 50	14 18.1	137.6	13 24.1	138.1	12 30.1	138.6	11 36.1	139.0	10 42.1	139.4	2 50
40	15 20.4	139.9	14 25.9	140.4	13 31.3	140.8	12 36.7	141.2	11 42.1	141.6	40
30	16 19.7	142.2	15 24.7	142.6	14 29.5	143.0	13 34.3	143.4	12 39.2	143.8	30
20	17 16.0	144.5	16 20.4	144.9	15 24.8	145.3	14 29.1	145.7	13 33.4	146.1	20
10	18 09.1	146.9	17 13.1	147.3	16 16.9	147.6	15 20.7	148.0	14 24.5	148.4	10
2 00	18 59.1	149.3	18 02.5	149.7	17 05.8	150.0	16 09.1	150.3	15 12.4	150.7	2 00
1 50	19 45.5	151.7	18 48.4	152.1	17 51.3	152.4	16 54.1	152.7	15 57.0	153.0	1 50
40	20 28.5	154.2	19 31.0	154.5	18 33.4	154.8	17 35.8	155.1	16 38.1	155.4	40
30	21 07.7	156.7	20 09.8	156.9	19 11.8	157.2	18 13.7	157.5	17 15.7	157.7	30
20	21 43.3	159.2	20 44.9	159.4	19 46.5	159.7	18 48.0	159.9	17 49.6	160.1	20
10	22 14.9	161.7	21 16.1	161.9	20 17.3	162.1	19 18.5	162.3	18 19.7	62.5	10
1 00	22 42.5	164.3	21 43.4	164.5	20 44.3	164.7	19 45.2	164.8	18 46.1	165.0	1 00
0 50	23 05.9	166.9	22 06.7	167.0	21 07.3	167.2	20 07.8	167.3	19 08.6	167.5	0 50
40	23 25.4	169.5	22 25.9	169.6	21 26.3	169.8	20 26.7	169.9	19 27.0	170.0	40
30	23 40.5	172.1	22 40.7	172.2	21 40.9	172.3	20 41.1	172.4	19 41.4	172.5	30
20	23 51.4	174.7	22 51.5	174.8	21 51.6	174.8	20 51.7	174.9	19 51.7	175.0	20
10	23 57.8	177.3	22 57.8	177.4	21 57.8	177.4	20 57.9	177.4	19 57.9	177.5	10
0 00	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 10	0 24.9	123.6									4 10
4 00	1 42.8	125.5	0 52.5	126.0	0 02.2	126.6					4 00
3 50	2 58.6	127.5	2 07.8	128.0	1 17.0	128.5	0 26.1	129.1			3 50
40	4 12.5	129.5	3 21.2	130.0	2 29.8	130.5	1 38.4	131.0	0 47.0	131.5	40
30	5 24.3	131.5	4 32.4	132.0	3 40.5	132.5	2 48.5	133.0	1 56.6	133.5	30
20	6 33.9	133.6	5 41.4	134.1	4 48.9	134.5	3 56.4	135.0	3 03.9	135.5	20
10	7 41.1	135.6	6 48.1	136.1	5 55.0	136.6	5 01.9	137.0	4 08.8	137.5	10
3 00	8 45.8	137.8	7 52.2	138.2	6 58.6	138.7	6 05.0	139.1	5 11.3	139.6	3 00
2 50	9 48.0	139.9	8 53.8	140.3	7 59.7	140.8	7 05.4	141.2	6 11.2	141.7	2 50
40	10 47.4	142.1	9 52.7	142.5	8 58.0	142.9	8 03.2	143.3	7 08.5	143.8	40
30	11 44.0	144.3	10 48.7	144.6	9 53.6	145.0	8 58.2	145.4	8 02.4	145.9	30
20	12 37.7	146.5	11 41.9	146.8	10 46.1	147.2	9 50.3	147.6	8 54.5	148.0	20
10	13 28.2	148.7	12 32.1	149.0	11 35.7	149.4	10 39.4	149.8	9 43.0	150.1	10
2 00	14 15.6	151.0	13 18.9	151.3	12 22.1	151.7	11 25.3	152.0	10 28.5	152.3	2 00
1 50	14 59.7	153.3	14 02.6	153.6	13 05.3	153.9	12 08.0	154.2	11 10.7	154.5	1 50
40	15 40.4	155.7	14 42.8	155.9	13 45.0	156.2	12 47.3	156.5	11 49.6	156.8	40
30	16 17.6	158.0	15 19.5	158.2	14 21.5	158.5	13 23.2	158.8	12 25.2	159.0	30
20	16 51.2	160.4	15 52.7	160.6	14 54.2	160.9	13 55.7	161.1	12 57.2	161.3	20
10	17 20.9	162.8	16 22.2	163.0	15 23.4	163.2	14 24.5	163.4	13 25.7	163.6	10
1 00	17 47.0	165.2	16 47.8	165.4	15 48.7	165.6	14 49.6	165.7	13 50.4	165.9	1 00
0 50	18 09.2	167.6	17 09.8	167.8	16 10.4	167.9	15 11.0	168.0	14 11.6	168.2	0 50
40	18 27.4	170.1	17 27.8	170.2	16 28.2	170.3	15 28.6	170.4	14 28.9	170.6	40
30	18 41.6	172.5	17 41.8	172.6	16 42.1	172.7	15 42.2	172.8	14 42.5	172.9	30
20	18 51.8	175.0	17 51.9	175.1	16 52.0	175.1	15 52.1	175.2	14 52.2	175.2	20
10	18 57.9	177.5	17 58.0	177.6	16 58.0	177.6	15 58.1	177.6	14 58.1	177.6	10
0 00	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	15 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 05.0	83.6	6 20
10					0 02.2	86.9	0 49.6	86.2	1 36.9	85.6	10
6 00	0 00.0	90.0	0 47.3	89.4	1 34.6	88.8	2 21.8	88.2	3 09.1	87.5	6 00
5 50	1 32.4	91.9	2 19.6	91.3	3 06.9	90.7	3 54.2	90.1	4 41.4	89.5	5 50
40	3 04.5	93.9	3 51.9	93.3	4 39.2	92.7	5 26.5	92.1	6 13.7	91.5	40
30	4 36.5	95.9	5 24.0	95.3	6 11.3	94.7	6 58.8	94.1	7 46.0	93.5	30
20	6 08.2	97.9	6 55.7	97.3	7 43.2	96.7	8 30.6	96.1	9 18.0	95.5	20
10	7 39.5	99.9	8 27.2	99.3	9 14.7	98.7	10 02.4	98.1	10 49.9	97.5	10
5 00	9 10.1	101.9	9 58.0	101.3	10 45.8	100.7	11 33.6	100.1	12 21.2	99.5	5 00
4 50	10 40.2	103.9	11 28.2	103.3	12 16.1	102.7	13 04.1	102.1	13 52.1	101.5	4 50
40	12 09.3	106.0	12 57.6	105.4	13 45.9	104.8	14 34.1	104.2	15 22.1	103.6	40
30	13 37.7	108.1	14 26.2	107.5	15 14.8	106.9	16 03.2	106.3	16 51.5	105.7	30
20	15 04.9	110.2	15 53.8	109.6	16 42.7	109.0	17 31.4	108.4	18 20.0	107.8	20
10	16 30.9	112.3	17 20.2	111.7	18 09.2	111.1	18 58.4	110.5	19 47.3	109.9	10
4 00	17 55.7	114.5	18 45.4	113.9	19 34.9	113.3	20 24.3	112.7	21 13.6	112.1	4 00
3 50	19 19.0	116.7	20 09.1	116.1	20 58.9	115.5	21 48.8	114.9	22 38.5	114.3	3 50
40	20 40.7	118.9	21 31.2	118.3	22 21.6	117.7	23 11.8	117.1	24 01.9	116.5	40
30	22 00.7	121.2	22 51.7	120.6	23 42.4	120.0	24 33.1	119.4	25 23.8	118.8	30
20	23 18.7	123.5	24 10.1	122.9	25 01.5	122.4	25 52.7	121.8	26 43.7	121.2	20
10	24 34.6	125.9	25 26.7	125.3	26 18.4	124.8	27 10.2	124.2	28 01.7	123.6	10
3 00	25 48.4	128.3	26 40.9	127.7	27 33.2	127.2	28 25.4	126.6	29 17.5	126.0	3 00
2 50	26 59.7	130.7	27 52.8	130.2	28 45.6	129.6	29 38.3	129.1	30 31.1	128.5	2 50
40	28 08.4	133.2	29 02.0	132.7	29 55.4	132.2	30 48.7	131.6	31 41.9	131.1	40
30	29 14.2	135.8	30 08.4	135.3	31 02.4	134.8	31 56.3	134.2	32 50.1	133.7	30
20	30 17.1	138.4	31 11.8	137.9	32 06.4	137.4	33 00.9	136.9	33 55.3	136.4	20
10	31 16.8	141.1	32 12.2	140.6	33 07.3	140.1	34 02.3	139.6	34 57.4	139.2	10
2 00	32 13.2	143.8	33 09.1	143.3	34 04.8	142.9	35 00.5	142.4	35 56.0	142.0	2 00
1 50	33 05.9	146.6	34 02.3	146.2	34 58.7	145.7	35 55.0	145.3	36 51.1	144.9	1 50
40	33 55.0	149.4	34 51.9	149.0	35 48.8	148.6	36 45.6	148.2	37 42.3	147.8	40
30	34 39.9	152.3	35 37.4	151.9	36 34.8	151.6	37 32.2	151.2	38 29.5	150.8	30
20	35 20.9	155.2	36 18.8	154.9	37 16.7	154.6	38 14.5	154.2	39 12.3	153.9	20
10	35 57.3	158.2	36 55.8	157.9	37 54.1	157.6	38 52.4	157.3	39 50.8	157.0	10
1 00	36 29.4	161.2	37 28.2	161.0	38 27.0	160.7	39 25.7	160.5	40 24.4	160.2	1 00
0 50	36 56.8	164.3	37 55.9	164.1	38 55.1	163.9	39 54.2	163.6	40 53.2	163.4	0 50
40	37 19.4	167.4	38 18.8	167.2	39 18.2	167.1	40 17.6	166.9	41 17.0	166.7	40
30	37 37.1	170.5	38 36.8	170.4	39 36.4	170.3	40 36.1	170.2	41 35.8	170.0	30
20	37 49.8	173.7	38 49.7	173.6	39 49.5	173.5	40 49.4	173.4	41 49.2	173.3	20
10	37 57.4	176.8	38 57.4	176.8	39 57.3	176.7	40 57.4	176.7	41 57.4	176.6	10
0 00	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 31.1	77.2	1 00.8	76.6	6 40
30			0 08.4	80.4	0 56.0	79.8	1 43.6	79.2	2 31.1	78.6	30
20	0 52.4	83.0	1 39.8	82.4	2 27.2	81.8	3 14.5	81.1	4 08.1	80.5	20
10	2 24.2	85.0	3 11.5	84.3	3 38.7	83.7	4 45.9	83.1	5 33.1	82.5	10
6 00	3 56.3	86.9	4 43.5	86.3	5 30.7	85.7	6 17.8	85.1	7 04.9	84.4	6 00
5 50	5 28.7	88.9	6 15.8	88.2	7 02.8	87.7	7 49.9	87.0	8 36.9	86.4	5 50
40	7 00.9	90.8	7 48.1	90.2	8 35.2	89.6	9 22.2	89.0	10 09.2	88.3	40
30	8 33.2	92.8	9 20.4	92.2	10 07.4	91.6	10 54.5	90.9	11 41.5	90.3	30
20	10 05.3	94.8	10 52.6	94.2	11 39.7	93.6	12 26.8	92.9	13 13.8	92.3	20
10	11 47.2	96.8	12 24.6	96.2	13 11.8	95.6	13 59.0	94.9	14 46.1	94.3	10
5 00	13 08.7	98.8	13 56.2	98.2	14 43.6	97.6	15 30.8	96.9	16 18.0	96.3	5 00
4 50	14 39.8	100.9	15 27.4	100.2	16 14.9	99.6	17 02.3	99.0	17 49.5	98.3	4 50
40	16 10.1	102.9	16 57.9	102.3	17 45.6	101.7	18 33.2	101.0	19 20.7	100.4	40
30	17 39.8	105.0	18 27.8	104.4	19 15.7	103.8	20 03.6	103.1	20 51.2	102.5	30
20	19 08.5	107.1	19 56.8	106.5	20 45.0	105.9	21 33.1	105.2	22 21.0	104.6	20
10	20 36.2	109.3	21 24.8	108.6	22 13.4	108.0	23 01.8	107.4	23 49.8	106.7	10
4 00	22 02.7	111.5	22 51.8	110.8	23 40.6	110.2	24 29.3	109.6	25 17.9	108.9	4 00
3 50	23 28.0	113.7	24 17.3	113.0	25 06.6	112.4	25 55.7	111.8	26 44.6	111.1	3 50
40	24 51.8	115.9	25 41.6	115.3	26 31.3	114.7	27 20.7	114.0	28 10.0	113.4	40
30	26 14.1	118.2	27 04.3	117.6	27 54.4	117.0	28 44.3	116.3	29 34.1	115.7	30
20	27 34.5	120.6	28 25.2	120.0	29 15.8	119.4	30 06.1	118.7	30 56.3	118.1	20
10	28 53.1	123.0	29 44.2	122.4	30 35.3	121.8	31 26.2	121.2	32 17.0	120.6	10
3 00	30 09.4	125.4	31 01.1	124.9	31 52.7	124.3	32 44.1	123.7	33 35.4	123.1	3 00
2 50	31 23.4	127.9	32 25.8	127.4	33 07.9	126.8	33 59.9	126.2	34 51.8	125.6	2 50
40	32 34.9	130.5	33 27.8	130.0	34 20.6	129.4	35 13.1	128.8	36 05.5	128.2	40
30	33 43.8	133.2	34 37.2	132.7	35 30.5	132.1	36 23.7	131.5	37 16.7	130.9	30
20	34 49.5	135.9	35 43.6	135.4	36 37.5	134.8	37 31.3	134.3	38 25.0	133.7	20
10	35 52.2	138.7	36 46.9	138.2	37 41.5	137.6	38 36.0	137.1	39 30.2	136.6	10
2 00	36 51.4	141.5	37 46.8	141.0	38 42.0	140.5	39 37.0	140.0	40 32.0	139.5	2 00
1 50	37 47.1	144.4	38 43.1	143.9	39 38.7	143.5	40 34.5	143.0	41 30.2	142.5	1 50
40	38 38.9	147.4	39 35.4	147.0	40 31.8	146.5	41 28.1	146.1	42 24.3	145.6	40
30	39 26.4	150.4	40 23.7	150.0	41 20.6	149.6	42 17.5	149.2	43 14.5	148.7	30
20	40 10.0	153.5	41 07.6	153.2	42 05.2	152.8	43 02.7	152.4	44 00.1	152.0	20
10	40 48.9	156.7	41 47.0	156.4	42 45.1	156.0	43 43.1	155.7	44 41.2	155.3	10
1 00	41 23.0	159.9	42 21.6	159.6	43 20.2	159.3	44 18.7	159.0	45 17.2	158.7	1 00
0 50	41 52.2	163.2	42 51.2	162.9	43 50.3	162.7	44 49.3	162.4	45 48.1	162.1	0 50
40	42 16.4	166.5	43 15.8	166.3	44 15.2	166.1	45 14.5	165.9	46 13.8	165.7	40
30	42 35.4	169.8	43 35.1	169.7	44 34.7	169.5	45 34.3	169.4	46 33.9	169.2	30
20	42 49.0	173.2	43 48.8	173.1	44 48.6	173.0	45 48.4	172.9	46 48.3	172.8	20
10	42 57.2	176.6	43 57.2	176.5	44 57.2	176.5	45 57.1	176.4	46 57.1	176.4	10
0 00	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10									0 37.8	67.7	7 10
7 00					0 27.4	70.9	1 15.6	70.3	2 03.8	69.7	7 00
6 50	0 19.3	74.0	1 07.2	73.4	1 55.2	72.8	2 43.1	72.2	3 31.1	71.6	6 50
40	1 48.5	76.0	2 36.2	75.4	3 23.8	74.8	4 11.4	74.2	4 59.1	73.6	40
30	3 18.5	77.9	4 05.9	77.3	4 53.4	76.7	5 40.8	76.1	6 28.1	75.5	30
20	4 49.1	79.9	5 36.3	79.3	6 23.5	78.7	7 10.7	78.0	7 57.9	77.4	20
10	6 20.3	81.8	7 07.4	81.2	7 54.5	80.6	8 41.4	79.9	9 28.4	79.3	10
6 00	7 51.9	83.8	8 38.9	83.2	9 25.8	82.6	10 12.7	81.9	10 59.4	81.3	6 00
5 50	9 23.9	85.7	10 10.6	85.1	10 57.5	84.5	11 44.2	83.8	12 31.0	83.2	5 50
40	10 56.1	87.7	11 42.9	87.1	12 29.6	86.4	13 16.3	85.8	14 02.8	85.1	40
30	12 28.3	89.7	13 15.1	89.0	14 01.9	88.4	14 48.4	87.8	15 34.9	87.0	30
20	14 00.7	91.7	14 47.5	91.0	15 34.2	90.4	16 20.8	89.7	17 07.3	89.0	30
10	15 32.9	93.7	16 19.8	93.0	17 06.4	92.3	17 53.1	91.7	18 39.7	91.0	10
5 00	17 05.0	95.7	17 51.9	95.0	18 38.7	94.3	19 25.4	93.7	20 11.9	93.0	5 00
4 50	18 36.7	97.7	19 23.7	97.0	20 10.6	96.3	20 56.6	95.7	21 44.0	95.0	4 50
40	20 08.0	99.7	20 55.2	99.1	21 42.2	98.4	22 29.1	97.7	23 15.8	97.0	40
30	21 38.7	101.8	22 26.1	101.1	23 13.3	100.5	24 00.3	99.8	24 47.2	99.1	30
20	23 08.8	103.9	23 56.4	103.3	24 43.8	102.6	25 31.1	101.9	26 18.1	101.2	20
10	24 38.0	106.1	25 25.8	105.4	26 13.5	104.7	27 01.0	104.0	27 48.3	103.3	10
4 00	26 06.2	108.3	26 54.4	107.6	27 42.4	106.9	28 30.2	106.2	29 17.8	105.5	4 00
3 50	27 33.3	110.5	28 21.8	109.8	29 10.2	109.1	29 58.3	108.4	30 46.3	107.7	3 50
40	28 59.1	112.8	29 48.1	112.1	30 36.8	111.4	31 25.3	110.7	32 13.7	110.0	40
30	30 23.5	115.1	31 12.9	114.4	32 02.1	113.7	32 50.3	113.0	33 39.7	112.3	30
20	31 46.4	117.5	32 26.3	116.8	33 25.9	116.1	34 15.3	115.4	35 04.4	114.7	20
10	33 08.0	119.9	33 57.7	119.2	34 47.8	118.6	35 37.8	117.9	36 27.4	117.2	10
3 00	34 26.5	122.4	35 17.4	121.7	36 08.0	121.1	36 58.4	120.4	37 48.6	119.7	3 00
2 50	35 43.2	125.0	36 34.7	124.3	37 25.9	123.7	38 16.9	123.0	39 07.8	122.3	2 50
40	36 57.7	127.6	37 49.8	127.0	38 41.6	126.3	39 33.2	125.7	40 24.6	125.0	40
30	38 09.5	130.3	39 02.2	129.7	39 54.7	129.1	40 46.9	128.5	41 39.0	127.8	30
20	39 18.5	133.1	40 11.8	132.5	41 04.9	131.9	41 57.8	131.3	42 50.5	130.6	20
10	40 24.3	136.0	41 18.3	135.4	42 12.1	134.8	43 05.7	134.1	43 59.1	133.6	10
2 00	41 26.8	139.0	42 21.4	138.4	43 15.9	137.8	44 10.2	137.1	45 04.3	136.6	2 00
1 50	42 25.5	142.0	43 20.8	141.5	44 16.0	140.9	45 11.0	140.3	46 05.8	139.8	1 50
40	43 20.4	145.1	44 16.4	144.6	45 12.2	144.1	46 07.9	143.6	47 03.5	143.0	40
30	44 11.1	148.3	45 07.7	147.9	46 04.3	147.4	47 00.5	146.9	47 56.9	146.3	30
20	44 47.4	151.6	45 54.7	151.2	46 51.8	150.7	47 48.9	150.2	48 45.8	149.8	20
10	45 39.0	154.9	46 36.7	154.6	47 34.6	154.2	48 32.2	153.7	49 29.8	153.3	10
1 00	46 15.6	158.4	47 13.9	158.1	48 12.2	157.7	49 10.5	157.3	50 08.7	156.9	1 00
0 50	46 47.0	161.9	47 45.8	161.6	48 44.6	161.3	49 43.3	161.0	50 42.1	160.6	0 50
40	47 13.0	165.4	48 12.3	165.2	49 11.5	164.9	50 10.7	164.7	51 09.8	164.4	40
30	47 33.4	169.0	48 33.0	168.8	49 32.6	168.6	50 32.0	168.4	51 31.8	168.2	30
20	47 48.1	172.7	48 48.0	172.6	49 47.8	172.4	50 47.6	172.3	51 47.4	172.1	20
10	47 57.0	176.3	48 56.9	176.3	49 56.9	176.2	50 56.5	176.1	51 56.9	176.1	10
0 00	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40									0 36.2	59.0	7 40
30					0 17.5	62.1	1 06.8	61.5	1 56.2	60.9	30
20	0 01.9	65.1	0 50.8	64.6	1 39.7	64.0	2 28.7	63.5	3 17.6	62.9	20
10	1 26.4	67.1	2 14.9	66.5	3 03.4	66.0	3 52.0	65.4	4 40.6	64.8	10
7 00	2 52.0	69.1	3 40.2	68.5	4 28.4	67.9	5 16.5	67.3	6 04.6	66.7	7 00
6 50	4 19.0	71.0	5 06.8	70.4	5 54.6	69.8	6 42.4	69.2	7 30.2	68.6	6 50
40	5 46.7	73.0	6 34.2	72.4	7 21.7	71.7	8 09.2	71.1	8 56.6	70.5	40
30	7 15.5	74.9	8 02.8	74.3	8 49.9	73.6	9 37.1	73.0	10 24.2	72.4	30
20	8 45.0	76.8	9 32.0	76.2	10 19.0	75.5	11 05.9	74.9	11 52.7	74.3	20
10	10 15.2	78.7	11 02.1	78.1	11 48.8	77.4	12 35.4	76.8	13 22.0	76.2	10
6 00	11 46.1	80.6	12 32.7	80.0	13 19.2	79.4	14 05.7	78.7	14 52.0	78.0	6 00
5 50	13 17.5	82.6	14 03.9	81.9	14 50.2	81.3	15 36.4	80.6	16 22.6	79.9	5 50
40	14 49.3	84.5	15 35.6	83.8	16 21.8	83.2	17 07.9	82.5	17 53.8	81.8	40
30	16 21.2	86.4	17 07.4	85.7	17 53.6	85.1	18 39.5	84.4	19 25.4	83.7	30
20	17 53.6	88.4	18 39.8	87.7	19 25.8	87.0	20 11.7	86.3	20 57.4	85.6	20
10	19 25.8	90.3	20 12.0	89.6	20 58.0	88.9	21 43.9	88.2	22 29.5	87.5	10
5 00	20 58.2	92.3	21 44.4	91.6	22 30.4	90.9	23 16.2	90.2	24 01.9	89.5	5 00
4 50	22 30.6	94.3	23 16.7	93.6	24 02.7	92.9	24 48.5	92.2	25 34.2	91.5	4 50
40	24 02.4	96.4	24 48.7	95.7	25 34.8	95.0	26 20.7	94.2	27 06.4	93.5	40
30	25 33.9	98.4	26 20.4	97.7	27 06.6	97.0	27 52.7	96.3	28 38.5	95.5	30
20	27 05.0	100.5	27 51.7	99.8	28 38.1	99.1	29 24.3	98.4	30 10.3	97.6	20
10	28 35.5	102.6	29 22.3	101.9	30 09.0	101.2	30 55.3	100.5	31 41.5	99.7	10
4 00	30 05.2	104.8	30 52.4	104.1	31 39.3	103.4	32 25.9	102.6	33 12.3	101.9	4 00
3 50	31 33.9	107.0	32 21.4	106.3	33 08.6	105.6	33 55.5	104.8	34 42.2	104.1	3 50
40	33 01.8	109.3	33 49.6	108.6	34 37.1	107.9	35 24.4	107.1	36 11.4	106.3	40
30	34 28.2	111.6	35 16.4	110.9	36 04.4	110.2	36 52.0	109.4	37 39.4	108.6	30
20	35 53.4	114.0	36 42.0	113.3	37 30.4	112.6	38 18.5	111.8	39 06.3	111.0	20
10	37 16.8	116.5	38 06.0	115.8	38 54.9	115.1	39 43.4	114.3	40 31.7	113.5	10
3 00	38 38.6	119.0	39 28.3	118.3	40 17.7	117.6	41 06.8	116.8	41 55.6	116.0	3 00
2 50	39 58.2	121.6	40 48.5	120.9	41 38.6	120.2	42 28.2	119.4	43 17.6	118.7	2 50
40	41 15.8	124.3	42 06.7	123.6	42 57.3	122.9	43 47.6	122.1	44 37.6	121.4	40
30	42 30.8	127.1	43 22.3	126.4	44 13.6	125.7	45 04.5	124.9	45 55.2	124.2	30
20	43 43.0	129.9	44 35.2	129.3	45 27.2	128.6	46 18.9	127.8	47 10.4	127.1	20
10	44 52.2	132.9	45 45.1	132.3	46 37.9	131.6	47 30.3	130.9	48 22.6	130.1	10
2 00	45 58.2	136.0	46 51.9	135.3	47 45.4	134.7	48 38.5	134.0	49 31.6	133.3	2 00
1 50	47 00.4	139.2	47 54.9	138.5	48 49.2	137.9	49 43.1	137.2	50 37.0	136.5	1 50
40	47 59.0	142.4	48 54.2	141.8	49 49.2	141.2	50 44.0	140.6	51 38.6	139.9	40
30	48 53.0	145.8	49 49.0	145.3	50 44.8	144.7	51 40.2	144.1	52 35.7	143.4	30
20	49 42.6	149.3	50 39.3	148.8	51 35.8	148.2	52 32.2	147.7	53 28.5	147.1	20
10	50 27.2	152.9	51 24.5	152.4	52 21.8	151.9	53 19.1	151.4	54 16.0	150.9	10
1 00	51 06.8	156.5	52 04.8	156.1	53 02.7	155.7	54 00.5	155.2	54 58.2	154.8	1 00
0 50	51 40.7	160.3	52 39.3	160.0	53 37.8	159.6	54 36.2	159.1	55 34.6	158.8	0 50
40	52 08.9	164.2	53 08.0	163.9	54 07.1	163.6	55 06.1	163.2	56 05.0	162.9	40
30	52 31.0	168.1	53 30.7	167.9	54 30.0	167.6	55 29.5	167.3	56 28.9	167.1	30
20	52 47.2	172.0	53 47.0	171.9	54 46.7	171.7	55 46.5	171.5	56 46.2	171.4	20
10	52 56.9	176.0	53 56.8	175.9	54 56.8	175.8	55 56.7	175.7	56 56.5	175.7	10
0 00	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00					0 33.6	53.4	1 24.4	52.9	2 15.2	52.4	8 00
7 50	0 08.2	56.5	0 58.4	55.9	1 48.7	55.4	2 38.9	54.8	3 29.2	54.3	7 50
40	1 26.0	58.4	2 15.8	57.9	3 05.5	57.3	3 55.3	56.8	4 45.0	56.2	40
30	2 45.5	60.3	3 34.8	59.8	4 24.1	59.2	5 13.3	58.7	6 02.6	58.1	30
20	4 06.5	62.3	4 55.4	61.7	5 44.2	61.1	6 33.0	60.6	7 21.8	60.0	20
10	5 28.9	64.2	6 17.4	63.6	7 05.8	63.0	7 54.1	62.4	8 42.5	61.8	10
7 00	6 52.7	66.1	7 40.8	65.5	8 28.8	64.9	9 16.7	64.3	10 04.6	63.7	7 00
6 50	8 17.7	68.0	9 05.4	67.4	9 52.9	66.7	10 40.5	66.1	11 27.9	65.5	6 50
40	9 43.9	69.9	10 31.2	69.3	11 18.4	68.6	12 05.6	68.0	12 52.6	67.3	40
30	11 11.2	71.7	11 58.1	71.1	12 44.9	70.4	13 31.7	69.8	14 18.4	69.2	30
20	12 39.4	73.6	13 26.0	73.0	14 12.5	72.3	14 58.9	71.7	15 45.2	71.1	20
10	14 08.4	75.5	14 54.7	74.8	15 40.8	74.1	16 27.0	73.5	17 13.0	72.9	10
6 00	15 38.2	77.4	16 24.2	76.7	17 10.2	76.0	17 56.0	75.4	18 41.6	74.7	6 00
5 50	17 08.5	79.2	17 54.5	78.6	18 40.2	77.9	19 25.7	77.2	20 11.1	76.5	5 50
40	18 39.6	81.1	19 25.2	80.4	20 10.7	79.8	20 56.1	79.1	21 41.2	78.4	40
30	20 11.0	81.1	20 56.5	82.3	21 41.7	81.6	22 26.9	80.9	23 11.9	80.2	30
20	21 42.9	84.9	22 28.3	84.2	23 13.4	83.5	23 58.4	82.8	24 43.2	82.1	20
10	23 15.0	86.8	24 10.3	86.1	24 45.3	85.4	25 30.2	84.7	26 14.9	84.0	10
5 00	24 47.3	88.8	25 32.5	88.1	26 17.5	87.3	27 02.3	86.6	27 46.8	85.9	5 00
4 50	26 19.5	90.8	27 04.8	90.1	27 49.7	89.3	28 34.6	88.5	29 19.0	87.8	4 50
40	27 51.9	92.8	28 37.2	92.0	29 22.2	91.3	30 06.9	90.5	30 51.4	89.7	40
30	29 24.0	94.8	30 09.3	94.0	30 54.4	93.3	31 39.2	92.5	32 23.7	91.7	30
20	30 56.0	96.9	31 41.4	96.1	32 26.5	95.3	33 11.4	94.5	33 55.9	93.7	20
10	32 27.3	99.0	33 12.9	98.2	33 58.2	97.4	34 43.2	96.6	35 27.9	95.8	10
4 00	33 58.4	101.1	34 44.2	100.3	35 29.6	99.5	36 14.8	98.7	36 59.6	97.9	4 00
3 50	35 28.6	103.3	36 14.6	102.5	37 00.3	101.7	37 45.8	100.9	38 30.8	100.1	3 50
40	36 58.1	105.5	37 44.5	104.7	38 30.5	103.9	39 16.2	103.1	40 01.5	102.3	40
30	38 26.4	107.8	39 13.1	107.0	39 59.5	106.2	40 45.7	105.4	41 31.2	104.6	30
20	39 53.8	110.2	40 40.9	109.4	41 27.7	108.6	42 14.2	107.7	43 00.2	106.9	20
10	41 19.7	112.7	42 07.2	111.9	42 54.6	111.0	43 41.5	110.1	44 27.9	109.3	10
3 00	42 44.1	115.2	43 32.2	114.4	44 20.0	113.6	45 07.4	112.7	45 54.4	111.9	3 00
2 50	44 06.6	117.9	44 55.3	117.0	45 43.7	116.2	46 31.8	115.3	47 19.3	114.5	2 50
40	45 27.3	120.6	46 16.7	119.8	47 05.7	118.9	47 54.3	118.0	48 42.5	117.2	40
30	46 45.5	123.4	47 35.7	122.6	48 25.4	121.7	49 14.7	120.8	50 03.6	120.0	30
20	48 01.5	126.3	48 52.3	125.5	49 42.8	124.7	50 32.9	123.8	51 22.5	123.0	20
10	49 14.2	129.3	50 06.0	128.6	50 57.1	127.8	51 48.0	126.9	52 38.5	126.1	10
2 00	50 24.3	132.5	51 16.6	131.8	52 08.7	130.9	53 00.4	130.1	53 51.7	129.3	2 00
1 50	51 30.2	135.8	52 23.6	135.1	53 16.5	134.3	54 09.1	133.5	55 01.4	132.7	1 50
40	52 32.9	139.3	53 27.0	138.5	54 20.8	137.8	55 14.3	137.0	56 07.5	136.2	40
30	53 30.9	142.8	54 25.9	142.1	55 20.6	141.4	56 15.1	140.6	57 09.2	139.8	30
20	54 24.5	146.5	55 20.3	145.9	56 15.9	145.2	57 11.3	144.5	58 06.4	143.8	20
10	55 12.6	150.3	56 09.4	149.7	57 05.9	149.1	58 02.1	148.5	58 58.2	147.8	10
1 00	55 55.8	154.3	56 53.2	153.8	57 50.5	153.2	58 47.7	152.6	59 44.6	152.0	1 00
0 50	56 32.7	158.4	57 31.0	157.9	58 29.1	157.4	59 27.0	156.9	60 24.7	156.4	0 50
40	57 03.9	162.5	58 02.6	162.2	59 01.3	161.8	59 59.9	161.4	60 58.4	160.9	40
30	57 28.0	166.8	58 27.3	166.5	59 26.7	166.2	60 26.0	165.9	61 25.0	165.6	30
20	57 45.9	171.2	58 45.6	171.0	59 45.2	170.8	60 44.8	170.6	61 44.4	170.3	20
10	57 56.5	175.6	58 56.3	175.5	59 56.2	175.4	60 56.1	175.3	61 56.0	175.2	10
0 00	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 32.4	91.9	0 45.1	92.6							5 50
40	3 04.5	93.9	2 17.2	94.6	1 29.8	95.2	0 42.4	95.8			40
30	4 36.5	95.9	3 49.1	96.5	3 01.6	97.1	2 14.2	97.8	1 26.6	98.4	30
20	6 08.2	97.9	5 20.6	98.5	4 33.0	99.1	3 45.4	99.7	2 57.7	100.4	20
10	7 39.5	99.9	6 51.8	100.5	6 03.9	101.1	5 16.2	101.7	4 28.3	102.4	10
5 00	9 10.1	101.9	8 22.2	102.5	7 34.2	103.2	6 46.2	103.8	5 58.1	104.4	5 00
4 50	10 40.2	103.9	9 52.0	104.5	9 03.7	105.2	8 15.5	105.8	7 27.2	106.4	4 50
40	12 09.3	106.0	11 20.9	106.6	10 32.4	107.2	9 43.9	107.8	8 55.3	108.4	40
30	13 37.7	108.1	12 48.9	108.7	12 00.2	109.3	11 11.3	109.9	10 22.4	110.4	30
20	15 04.9	110.2	14 15.9	110.8	13 26.8	111.4	12 37.6	112.0	11 48.3	112.5	20
10	16 30.9	112.3	15 41.6	112.9	14 52.0	113.5	14 02.6	114.1	13 12.9	114.6	10
4 00	17 55.7	114.5	17 06.0	115.1	16 16.2	115.6	15 26.2	116.2	14 36.2	116.8	4 00
3 50	19 19.0	116.7	18 28.9	117.3	17 38.6	117.8	16 48.2	118.4	15 57.8	119.0	3 50
40	20 40.7	118.9	19 50.1	119.5	18 59.4	120.0	18 08.6	120.6	17 17.7	121.2	40
30	22 00.7	121.2	21 09.7	121.8	20 18.4	122.3	19 27.2	122.8	18 35.8	123.4	30
20	23 18.7	123.5	22 27.2	124.1	21 35.5	124.6	20 43.8	125.1	19 51.9	125.7	20
10	24 34.6	125.9	23 42.8	126.4	22 50.5	126.9	21 58.2	127.4	21 05.9	128.0	10
3 00	25 48.4	128.3	24 55.8	128.8	24 03.2	129.3	23 10.4	129.8	22 17.5	130.3	3 00
2 50	26 59.7	130.7	26 06.6	131.2	25 13.4	131.7	24 20.1	132.2	23 26.7	132.7	2 50
40	28 08.4	133.2	27 14.7	133.7	26 21.0	134.2	25 27.1	134.7	24 33.1	135.2	40
30	29 14.2	135.8	28 20.1	136.3	27 25.7	136.7	26 31.3	137.2	25 36.8	137.7	30
20	30 17.1	138.4	29 22.3	138.9	28 27.4	139.3	27 32.5	139.8	26 37.4	140.2	20
10	31 16.8	141.1	30 21.6	141.5	29 26.0	141.9	28 30.5	142.4	27 34.9	142.8	10
2 00	32 13.2	143.8	31 17.3	144.2	30 21.3	144.6	29 25.2	145.0	28 29.0	145.4	2 00
1 50	33 05.9	146.6	32 09.5	147.0	31 12.9	147.3	30 16.4	147.7	29 19.7	148.1	1 50
40	33 55.0	149.4	32 58.0	149.8	32 00.9	150.1	31 03.8	150.5	30 06.6	150.8	40
30	34 39.9	152.3	33 42.5	152.6	32 44.8	152.9	31 47.2	153.3	30 49.7	153.6	30
20	35 20.9	155.2	34 22.9	155.5	33 24.8	155.8	32 26.7	156.1	31 28.6	156.4	20
10	35 57.3	158.2	34 59.0	158.5	34 00.4	158.7	33 02.0	159.0	32 03.5	159.3	10
1 00	36 29.4	161.2	35 30.6	161.5	34 31.8	161.7	33 32.9	161.9	32 34.0	162.2	1 00
0 50	36 56.8	164.3	35 57.8	164.5	34 58.4	164.7	33 59.2	164.9	33 00.0	165.1	0 50
40	37 19.4	167.4	36 19.9	167.6	35 20.4	167.7	34 20.9	167.9	33 21.4	168.0	40
30	37 37.1	170.5	36 37.4	170.6	35 37.7	170.7	34 38.0	170.9	33 38.2	171.0	30
20	37 49.8	173.7	36 49.9	173.8	35 50.1	173.8	34 50.2	173.9	33 50.3	174.0	20
10	37 57.4	176.8	36 57.5	176.9	35 57.5	176.9	34 57.6	177.0	33 57.6	177.0	10
0 00	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 39.1	99.0									5 30
20	2 10.0	101.0	1 22.3	101.6	0 34.6	102.2					20
10	3 40.4	103.0	2 52.5	103.5	2 04.6	104.1	1 16.7	104.7	0 28.7	105.3	10
5 00	5 10.0	104.9	4 21.9	105.5	3 33.7	106.1	2 45.5	106.7	1 57.3	107.3	5 00
4 50	6 38.8	106.9	5 50.4	107.5	5 01.9	108.1	4 13.5	108.7	3 24.8	109.3	4 50
40	8 06.6	109.0	7 17.9	109.6	6 29.1	110.2	5 40.3	110.8	4 51.5	111.3	40
30	9 33.4	111.0	8 44.4	111.6	7 55.3	112.2	7 06.2	112.8	6 16.9	113.3	30
20	10 59.0	113.1	10 09.6	113.7	9 20.1	114.3	8 30.6	114.8	7 41.1	115.4	20
10	12 23.2	115.2	11 33.4	115.8	10 43.6	116.4	9 53.8	116.9	9 03.6	117.5	10
4 00	13 46.1	117.4	12 55.8	117.9	12 05.6	118.5	11 15.2	119.0	10 24.8	119.6	4 00
3 50	15 07.2	119.5	14 16.6	120.0	13 25.9	120.6	12 35.1	121.1	11 44.3	121.7	3 50
40	16 26.7	121.7	15 35.7	122.2	14 44.5	122.8	13 53.3	123.3	13 02.0	123.9	40
30	17 44.4	123.9	16 52.8	124.4	16 01.1	125.0	15 09.5	125.5	14 17.6	126.1	30
20	18 59.9	126.2	18 07.9	126.7	17 15.7	127.2	16 23.5	127.7	15 31.2	128.3	20
10	20 13.4	128.5	19 20.8	129.0	18 28.2	129.5	17 35.5	130.0	16 42.6	130.5	10
3 00	21 24.5	130.8	20 31.4	131.3	19 38.2	131.8	18 44.9	132.3	17 51.6	132.8	3 00
2 50	22 33.1	133.2	21 39.4	133.7	20 45.8	134.2	19 52.0	134.6	18 58.1	135.1	2 50
40	23 39.0	135.7	22 44.9	136.1	21 50.6	136.6	20 56.3	137.0	20 01.9	137.5	40
30	24 42.1	138.2	23 47.4	138.6	22 52.6	139.0	21 57.8	139.4	21 02.8	139.9	30
20	25 42.2	140.7	24 47.0	141.1	23 51.7	141.5	22 56.3	141.9	22 00.9	142.3	20
10	26 39.2	143.2	25 43.4	143.6	24 47.6	144.0	23 51.8	144.4	22 55.6	144.8	10
2 00	27 32.8	145.8	26 36.5	146.2	25 40.1	146.6	24 43.7	147.0	23 47.3	147.3	2 00
1 50	28 22.9	148.5	27 26.1	148.8	26 29.2	149.2	25 32.2	149.6	24 35.3	149.9	1 50
40	29 09.3	151.2	28 12.0	151.5	27 14.6	151.9	26 17.2	152.2	25 19.8	152.5	40
30	29 51.9	153.9	28 54.1	154.2	27 56.3	154.5	26 58.4	154.8	26 00.5	155.1	30
20	30 30.4	156.7	29 32.2	157.0	28 34.0	157.3	27 35.7	157.5	26 37.4	157.8	20
10	31 04.9	159.5	30 06.2	159.8	29 07.7	160.0	28 09.0	160.2	27 10.3	160.5	10
1 00	31 35.0	162.4	30 36.0	162.6	29 37.0	162.8	28 38.0	163.0	27 39.0	163.2	1 00
0 50	32 00.8	165.3	31 01.4	165.4	30 02.2	165.6	29 02.9	165.8	28 03.5	166.0	0 50
40	32 21.9	168.2	31 22.4	168.3	30 22.9	168.5	29 23.4	168.6	28 23.9	168.8	40
30	32 38.5	171.1	31 38.8	171.2	30 39.1	171.3	29 39.3	171.4	28 39.5	171.5	30
20	32 50.4	174.1	31 50.5	174.1	30 50.6	174.2	29 50.7	174.3	28 50.9	174.4	20
10	32 57.6	177.0	31 57.7	177.0	30 57.7	177.1	29 57.7	177.1	28 57.7	177.2	10
0 00	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	1 09.1	107.9	0 20.8	108.5							5 00
4 50	2 36.5	109.9	1 47.9	110.5	0 59.3	111.1	0 10.8	111.7			4 50
40	4 02.7	111.9	3 13.8	112.5	2 24.9	113.1	1 26.0	113.6	0 47.1	114.3	40
30	5 27.8	113.9	4 38.5	114.5	3 49.2	115.1	2 59.9	115.6	2 10.6	116.2	30
20	6 51.5	116.0	6 01.9	116.6	5 12.2	117.1	4 22.5	117.6	3 32.8	118.2	20
10	8 13.8	118.0	7 23.7	118.6	6 33.6	119.1	5 43.4	119.7	4 53.2	120.2	10
4 00	9 34.4	120.1	8 43.9	120.7	7 53.4	121.2	7 02.8	121.8	6 12.2	122.3	4 00
3 50	10 53.4	122.2	10 02.5	122.8	9 11.5	123.3	8 20.4	123.9	7 29.4	124.4	3 50
40	12 10.6	124.4	11 19.2	124.9	10 27.7	125.4	9 36.2	126.0	8 44.6	126.5	40
30	13 25.8	126.6	12 33.9	127.1	11 42.0	127.6	10 50.7	128.1	9 57.8	128.6	30
20	14 38.9	128.8	13 46.5	129.3	12 54.0	129.8	12 01.5	130.3	11 08.9	130.8	20
10	15 49.9	131.0	14 56.9	131.5	14 03.9	132.0	13 10.8	132.5	12 17.7	133.0	10
3 00	16 58.2	133.3	16 04.8	133.8	15 11.3	134.2	14 17.7	134.7	13 24.1	135.2	3 00
2 50	18 04.2	135.6	17 10.2	136.1	16 16.2	136.5	15 22.1	136.9	14 27.9	137.4	2 50
40	19 07.5	137.9	18 13.0	138.4	17 18.4	138.8	16 23.8	139.2	15 29.1	139.7	40
30	20 07.9	140.3	19 12.9	140.8	18 17.8	141.2	17 22.7	141.6	16 27.4	142.0	30
20	21 05.4	142.8	20 09.8	143.2	19 14.2	143.6	18 18.5	143.9	17 22.9	144.3	20
10	21 59.7	145.2	21 03.6	145.6	20 07.5	146.0	19 11.3	146.3	18 15.1	146.7	10
2 00	22 50.8	147.7	21 54.2	148.1	20 57.6	148.4	20 00.9	148.8	19 04.2	149.1	2 00
1 50	23 38.4	150.2	22 41.3	150.6	21 44.2	150.9	20 47.0	151.2	19 49.8	151.5	1 50
40	24 22.3	152.8	23 24.8	153.1	22 27.3	153.4	21 29.7	153.7	20 32.1	154.0	40
30	25 02.7	155.4	24 04.8	155.7	23 06.8	156.0	22 08.7	156.3	21 10.7	156.5	30
20	25 39.1	158.0	24 40.8	158.3	23 42.4	158.6	22 44.0	158.8	21 45.6	159.0	20
10	26 11.7	160.7	25 12.9	161.0	24 14.2	161.2	23 15.4	161.4	22 16.6	161.6	10
1 00	26 40.0	163.4	25 40.9	163.6	24 41.9	163.8	23 42.8	164.0	22 43.8	164.2	1 00
0 50	27 04.3	166.1	26 05.0	166.3	25 05.6	166.5	24 06.2	166.6	23 06.9	166.8	0 50
40	27 24.3	168.9	26 24.8	169.0	25 25.2	169.2	24 25.6	169.3	23 26.0	169.4	40
30	27 39.8	171.6	26 40.2	171.7	25 40.4	171.9	24 40.5	171.9	23 40.8	172.0	30
20	27 51.0	174.4	26 51.2	174.5	25 51.3	174.6	24 51.4	174.6	23 51.5	174.7	20
10	27 57.8	177.2	26 57.8	177.2	25 57.8	177.3	24 57.8	177.3	23 57.9	177.3	10
0 00	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	1 21.2	116.8	0 31.9	117.4							4 30
20	2 43.0	118.8	1 53.2	119.3	1 03.4	119.9	0 13.6	120.5			20
10	4 03.1	120.8	3 12.9	121.3	2 22.6	121.9	1 32.3	122.4	0 42.0	123.0	10
4 00	5 21.6	122.9	4 30.9	123.4	3 40.2	123.9	2 49.5	124.5	1 58.7	125.0	4 00
3 50	6 38.2	124.9	5 47.1	125.4	4 55.8	125.9	4 04.6	126.5	3 13.3	127.0	3 50
40	7 53.0	127.0	7 01.3	127.5	6 09.6	128.0	5 17.9	128.5	4 26.2	129.0	40
30	9 05.8	129.1	8 13.5	129.6	7 21.3	130.1	6 29.1	130.6	5 36.8	131.1	30
20	10 16.3	131.2	9 23.6	131.7	8 30.9	132.2	7 38.2	132.7	6 45.4	133.2	20
10	11 24.6	133.4	10 31.3	133.9	9 38.1	134.3	8 44.8	134.8	7 51.5	135.3	10
3 00	12 30.4	135.6	11 36.7	136.1	10 42.9	136.5	9 49.1	137.0	8 55.3	137.4	3 00
2 50	13 33.7	137.8	12 39.4	138.3	11 45.1	138.7	10 50.9	139.2	9 56.4	139.6	2 50
40	14 34.4	140.1	13 39.6	140.5	12 44.8	140.9	11 49.9	141.4	10 55.0	141.8	40
30	15 32.2	142.4	14 36.8	142.8	13 41.5	143.2	12 46.1	143.6	11 50.7	144.0	30
20	16 27.1	144.7	15 31.3	145.1	14 35.5	145.5	13 39.6	145.9	12 43.7	146.2	20
10	17 18.9	147.1	16 22.5	147.4	15 26.1	147.8	14 29.8	148.2	13 33.4	148.5	10
2 00	18 07.4	149.5	17 10.6	149.8	16 13.8	150.1	15 17.0	150.5	14 20.1	150.8	2 00
1 50	18 52.7	151.9	17 55.4	152.2	16 58.1	152.5	16 00.8	152.8	15 03.5	153.1	1 50
40	19 34.5	154.3	18 36.8	154.6	17 39.1	154.9	16 41.4	155.2	15 43.6	155.5	40
30	20 12.4	156.8	19 14.5	157.0	18 16.4	157.3	17 18.2	157.6	16 20.1	157.9	30
20	20 47.2	159.3	19 48.7	159.5	18 50.2	159.8	17 51.7	160.0	16 53.2	160.3	20
10	21 17.9	161.8	20 19.0	162.0	19 20.1	162.2	18 21.4	162.4	17 22.5	162.7	10
1 00	21 44.7	164.4	20 45.6	164.6	19 46.5	164.8	18 47.3	164.9	17 48.2	165.1	1 00
0 50	22 07.6	167.0	21 08.1	167.1	20 08.7	167.3	19 09.3	167.4	18 09.9	167.6	0 50
40	22 26.4	169.6	21 26.8	169.7	20 27.2	169.8	19 27.6	169.9	18 28.0	170.0	40
30	22 41.0	172.1	21 41.2	172.2	20 41.4	172.3	19 41.8	172.4	18 41.8	172.5	30
20	22 51.6	174.7	21 51.7	174.8	20 51.8	174.9	19 51.9	174.9	18 52.0	175.0	20
10	22 57.9	177.3	21 57.9	177.4	20 57.9	177.4	19 57.9	177.4	18 58.0	177.5	10
0 00	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 00	1 08. 0	125. 5	0 17. 2	126. 1							4 00
3 50	2 22. 2	127. 5	1 30. 9	128. 0	0 39. 6	128. 5					3 50
40	3 34. 4	129. 5	2 42. 6	130. 0	1 50. 8	130. 6	0 59. 0	131. 1	0 07. 2	131. 5	40
30	4 44. 6	131. 6	3 52. 2	132. 1	2 59. 9	132. 6	2 07. 6	133. 1	1 15. 2	133. 5	30
20	5 52. 6	133. 7	4 59. 7	134. 1	4 06. 8	134. 6	3 13. 9	135. 1	2 21. 0	135. 5	20
10	6 58. 2	135. 7	6 04. 8	136. 2	5 11. 4	136. 6	4 18. 0	137. 1	3 24. 5	137. 6	10
3 00	8 01. 4	137. 9	7 07. 5	138. 3	6 13. 6	138. 7	5 19. 6	139. 2	4 25. 6	139. 6	3 00
2 50	9 02. 1	140. 0	8 07. 7	140. 4	7 13. 1	140. 8	6 18. 7	141. 3	5 24. 2	141. 7	2 50
40	10 00. 1	142. 2	9 05. 1	142. 6	8 10. 2	143. 0	7 15. 1	143. 4	6 20. 1	143. 8	40
30	10 55. 2	144. 4	9 59. 9	144. 7	9 04. 3	145. 1	8 08. 7	145. 5	7 13. 2	145. 9	30
20	11 47. 7	146. 6	10 51. 7	146. 9	9 55. 7	147. 3	8 59. 7	147. 7	8 03. 6	148. 1	20
10	12 36. 9	148. 8	11 40. 6	149. 2	10 44. 0	149. 5	9 47. 5	149. 9	8 51. 0	150. 3	10
2 00	13 23. 2	151. 1	12 26. 3	151. 5	11 29. 3	151. 8	10 32. 3	152. 1	9 35. 3	152. 4	2 00
1 50	14 06. 1	153. 4	13 08. 7	153. 7	12 11. 3	154. 0	11 13. 9	154. 3	10 16. 5	154. 6	1 50
40	14 45. 8	155. 8	13 48. 0	156. 0	12 50. 1	156. 3	11 52. 3	156. 6	10 54. 4	156. 8	40
30	15 21. 9	158. 1	14 23. 8	158. 3	13 25. 6	158. 6	12 27. 3	158. 9	11 29. 2	159. 1	30
20	15 54. 7	160. 5	14 56. 1	160. 7	13 57. 5	160. 9	12 58. 9	161. 2	12 00. 3	161. 4	20
10	16 23. 6	162. 9	15 24. 8	163. 1	14 25. 8	163. 2	13 26. 9	163. 5	12 28. 0	163. 7	10
1 00	16 49. 0	165. 3	15 49. 8	165. 5	14 50. 6	165. 6	13 51. 4	165. 8	12 52. 2	166. 0	1 00
0 50	17 10. 5	167. 7	16 11. 2	167. 9	15 11. 7	168. 0	14 12. 2	168. 2	13 12. 8	168. 3	0 50
40	17 28. 4	170. 1	16 28. 7	170. 3	15 29. 1	170. 4	14 29. 4	170. 5	13 29. 7	170. 6	40
30	17 42. 1	172. 6	16 42. 3	172. 7	15 42. 6	172. 8	14 42. 8	172. 9	13 42. 9	173. 0	30
20	17 52. 1	175. 1	16 52. 2	175. 1	15 52. 3	175. 2	14 52. 3	175. 2	13 52. 4	175. 3	20
10	17 58. 1	177. 5	16 58. 1	177. 6	15 58. 1	177. 6	14 38. 1	177. 6	13 58. 1	177. 6	10
0 00	18 0. 0	180. 0	17 0. 0	180. 0	16 0. 0	180. 0	15 0. 0	180. 0	14 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 11.7	83.6	6 20
10					0 05.6	86.9	0 53.6	86.2	1 41.6	85.6	10
6 00	0 00.0	90.0	0 47.9	89.4	1 35.9	88.8	2 23.8	88.2	3 11.6	87.6	6 00
5 50	1 30.2	92.0	2 18.2	91.4	3 06.1	90.8	3 54.0	90.2	4 41.9	89.6	5 50
40	3 00.4	94.0	3 48.4	93.4	4 36.3	92.8	5 24.2	92.2	6 12.1	91.6	40
30	4 30.4	96.0	5 18.4	95.4	6 06.4	94.8	6 54.4	94.2	7 42.3	93.6	30
20	5 59.9	98.0	6 48.1	97.4	7 36.2	96.8	8 24.2	96.2	9 12.2	95.6	20
10	7 29.1	100.0	8 17.4	99.4	9 05.6	98.8	9 53.8	98.2	10 42.0	97.6	10
5 00	8 57.7	102.1	9 46.1	101.5	10 34.5	100.9	11 22.9	100.3	12 11.2	99.7	5 00
4 50	10 25.6	104.1	11 14.2	103.5	12 02.8	102.9	12 51.4	102.3	13 39.9	101.7	4 50
40	11 52.7	106.2	12 41.6	105.6	13 30.5	105.0	14 19.2	104.4	15 07.9	103.8	40
30	13 18.9	108.3	14 08.1	107.7	14 57.2	107.1	15 46.2	106.5	16 35.2	105.9	30
20	14 44.1	110.4	15 33.6	109.8	16 23.0	109.3	17 12.3	108.7	18 01.5	108.1	20
10	16 08.0	112.5	16 57.7	112.0	17 47.6	111.4	18 37.2	110.8	19 26.8	110.2	10
4 00	17 30.7	114.7	18 21.0	114.2	19 11.1	113.6	20 01.0	113.0	20 50.9	112.4	4 00
3 50	18 51.9	116.9	19 42.5	116.4	20 33.1	115.8	21 23.3	115.2	22 13.6	114.6	3 50
40	20 11.6	119.2	21 02.6	118.7	21 53.5	118.1	22 44.3	117.5	23 34.9	116.9	40
30	21 29.5	121.5	22 21.0	121.0	23 12.2	120.4	24 03.5	119.8	24 54.6	119.2	30
20	22 45.5	123.8	23 37.4	123.3	24 29.2	122.7	25 20.9	122.2	26 12.4	121.6	20
10	23 59.4	126.2	24 51.8	125.7	25 44.2	125.1	26 36.2	124.6	27 28.2	124.0	10
3 00	25 11.1	128.6	26 04.1	128.1	26 56.8	127.6	27 49.4	127.0	28 42.0	126.5	3 00
2 50	26 20.4	131.1	27 13.8	130.6	28 07.1	130.1	29 00.2	129.5	29 53.4	129.0	2 50
40	27 27.1	133.6	28 21.1	133.1	29 15.0	132.6	30 08.7	132.1	31 02.3	131.6	40
30	28 31.1	136.2	29 25.7	135.7	30 20.1	135.2	31 14.3	134.7	32 08.4	134.2	30
20	29 32.1	138.8	30 27.2	138.3	31 22.1	137.8	32 16.9	137.4	33 11.7	136.9	20
10	30 30.1	141.4	31 25.7	141.0	32 21.1	140.5	33 16.5	140.1	34 11.8	139.6	10
2 00	31 24.7	144.1	32 20.8	143.7	33 16.8	143.3	34 12.8	142.9	35 08.6	142.4	2 00
1 50	32 15.8	146.9	33 12.4	146.5	34 09.0	146.1	35 05.5	145.7	36 01.8	145.3	1 50
40	33 03.2	149.7	34 00.4	149.4	34 57.5	149.0	35 54.5	148.6	36 51.4	148.2	40
30	33 46.7	152.6	34 44.4	152.3	35 42.0	151.9	36 39.5	151.6	37 36.9	151.2	30
20	34 26.3	155.5	35 24.4	155.2	36 22.4	154.9	37 20.4	154.6	38 18.3	154.2	20
10	35 01.5	158.5	36 00.2	158.2	36 58.6	157.9	37 56.9	157.6	38 55.4	157.3	10
1 00	35 32.5	161.5	36 31.4	161.2	37 30.3	161.0	38 29.1	160.7	39 27.9	160.5	1 00
0 50	35 59.0	164.5	36 58.2	164.3	37 57.4	164.1	38 56.6	163.9	39 55.8	163.7	0 50
40	36 20.8	167.6	37 20.3	167.4	38 19.7	167.2	39 19.2	167.1	40 18.6	166.9	40
30	36 37.9	170.7	37 37.6	170.5	38 37.3	170.4	39 37.0	170.3	40 36.7	170.1	30
20	36 50.1	173.8	37 50.0	173.7	38 49.9	173.6	39 49.8	173.5	40 49.6	173.4	20
10	36 57.5	176.9	37 57.5	176.8	38 57.4	176.8	39 57.4	176.7	40 57.5	176.7	10
0 00	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 40							0 26.4	77.2	1 14.7	76.6	6 40
30			0 18.4	80.4	1 06.6	79.8	1 54.9	79.2	2 42.9	78.6	30
20	0 59.7	83.0	1 47.7	82.4	2 35.7	81.8	3 23.7	81.2	4 11.7	80.6	20
10	2 29.5	85.0	3 17.4	84.4	4 05.3	83.8	4 53.1	83.2	5 40.9	82.6	10
6 00	3 59.5	87.0	4 47.3	86.4	5 35.1	85.8	6 22.9	85.2	7 10.6	84.6	6 00
5 50	5 29.8	89.0	6 17.6	88.4	7 05.3	87.8	7 53.0	87.1	8 40.6	86.5	5 50
40	7 00.0	91.0	7 47.8	90.4	8 35.5	89.8	9 23.2	89.1	10 10.8	88.5	40
30	8 30.2	93.0	9 18.0	92.4	10 05.9	91.8	10 53.5	91.1	11 41.1	90.5	30
20	10 00.2	95.0	10 48.1	94.4	11 35.9	93.8	12 23.7	93.1	13 11.3	92.5	20
10	11 30.1	97.0	12 18.0	96.4	13 05.9	95.8	13 53.7	95.1	14 41.5	94.5	10
5 00	12 59.4	99.1	13 47.5	98.5	14 35.5	97.8	15 23.4	97.2	16 11.3	96.6	5 00
4 50	14 28.3	101.1	15 16.6	100.5	16 04.6	99.9	16 52.7	99.3	17 40.6	98.6	4 50
40	15 56.5	103.2	16 45.0	102.6	17 33.3	102.0	18 21.6	101.4	19 09.7	100.7	40
30	17 24.0	105.3	18 12.7	104.7	19 01.3	104.1	19 49.7	103.5	20 38.1	102.8	30
20	18 50.6	107.5	19 39.6	106.8	20 28.4	106.2	21 17.2	105.6	22 05.8	105.0	20
10	20 16.2	109.6	21 05.4	109.0	21 54.6	108.4	22 43.5	107.8	23 32.5	107.1	10
4 00	21 40.6	111.8	22 30.2	111.2	23 19.7	110.6	24 09.0	110.0	24 58.2	109.3	4 00
3 50	23 03.8	114.0	23 53.7	113.4	24 43.5	112.8	25 33.3	112.2	26 22.8	111.6	3 50
40	24 25.5	116.3	25 15.8	115.7	26 06.1	115.1	26 56.1	114.5	27 46.0	113.9	40
30	25 45.5	118.6	26 36.3	118.0	27 26.9	117.4	28 17.4	116.8	29 07.8	116.2	30
20	27 03.8	121.0	27 55.1	120.4	28 46.2	119.8	29 37.1	119.2	30 27.9	118.6	20
10	28 20.2	123.4	29 11.9	122.9	30 03.5	122.3	30 54.8	121.7	31 46.2	121.1	10
3 00	29 34.4	125.9	30 26.6	125.4	31 18.7	124.8	32 10.7	124.2	33 02.5	123.6	3 00
2 50	30 46.4	128.4	31 39.2	127.9	32 31.8	127.3	33 24.2	126.8	34 16.6	126.2	2 50
40	31 55.7	131.0	32 49.1	130.5	33 42.3	129.9	34 35.3	129.4	35 28.2	128.8	40
30	33 02.6	133.7	33 56.4	133.2	34 50.1	132.6	35 43.7	132.1	36 37.2	131.5	30
20	34 06.3	136.4	35 00.8	135.9	35 55.1	135.3	36 49.3	134.8	37 43.4	134.3	20
10	35 07.1	139.1	36 02.0	138.7	36 57.0	138.1	37 51.7	137.6	38 46.5	137.1	10
2 00	36 04.3	142.0	37 00.0	141.5	37 55.6	141.0	38 50.9	140.5	39 46.2	140.0	2 00
1 50	36 58.2	144.9	37 54.4	144.4	38 50.5	144.0	39 46.4	143.5	40 42.4	143.0	1 50
40	37 48.3	147.8	38 45.0	147.4	39 41.7	147.0	40 38.2	146.5	41 34.7	146.1	40
30	38 34.3	150.8	39 31.5	150.4	40 28.9	150.0	41 26.0	149.6	42 23.1	149.2	30
20	39 16.2	153.9	40 14.0	153.5	41 11.8	153.2	42 09.4	152.8	43 07.0	152.4	20
10	39 53.8	157.0	40 52.0	156.7	41 50.2	156.4	42 48.4	156.1	43 46.5	155.7	10
1 00	40 26.7	160.2	41 25.4	159.9	42 24.1	159.7	43 22.7	159.4	44 21.3	159.1	1 00
0 50	40 54.8	163.4	41 53.8	163.2	42 53.0	163.0	43 52.0	162.7	44 51.0	162.5	0 50
40	41 18.1	166.7	42 17.5	166.5	43 16.9	166.3	44 16.3	166.1	45 15.6	165.9	40
30	41 36.3	170.0	42 36.0	169.8	43 35.8	169.7	44 35.3	169.5	45 35.0	169.4	30
20	41 49.5	173.3	42 49.3	173.2	43 49.1	173.1	44 49.0	173.0	45 48.8	172.9	20
10	41 57.5	176.6	42 57.4	176.6	43 57.3	176.5	44 57.3	176.5	45 57.2	176.4	10
0 00	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 10							0 11.5	68.3	1 00.7	67.8	7 10
7 00					0 47.1	70.9	1 35.9	70.3	2 24.6	69.7	7 00
6 50	0 35.8	74.1	1 24.3	73.5	2 12.9	72.9	3 01.4	72.3	3 49.9	71.7	6 50
40	2 03.0	76.0	2 51.3	75.4	3 39.5	74.9	4 28.8	74.3	5 16.0	73.7	40
30	3 31.0	78.0	4 19.1	77.4	5 07.1	76.8	5 55.1	76.2	6 43.1	75.6	30
20	4 59.6	80.0	5 47.4	79.4	6 35.3	78.8	7 23.1	78.2	8 10.9	77.6	20
10	6 28.8	81.9	7 16.4	81.3	8 04.1	80.7	8 51.8	80.1	9 39.4	70.5	10
6 00	7 58.3	83.9	8 45.9	83.3	9 33.5	82.7	10 21.0	82.1	11 08.4	81.5	6 00
5 50	9 28.2	85.9	10 15.7	85.3	11 03.2	84.6	11 50.6	84.0	12 37.9	83.4	5 50
40	10 58.4	87.9	11 45.9	87.3	12 33.2	86.6	13 20.5	86.0	14 07.7	85.4	40
30	12 28.6	89.9	13 16.0	89.3	14 03.4	88.6	14 50.7	88.0	15 37.8	87.3	30
20	13 58.5	91.9	14 46.3	91.3	15 33.6	90.6	16 20.9	90.0	17 08.1	89.3	20
10	15 29.0	93.9	16 16.5	93.3	17 03.9	92.6	17 51.1	92.0	18 38.3	91.3	10
5 00	16 58.9	96.0	17 46.5	95.4	18 34.0	94.7	19 21.3	94.0	20 08.5	93.4	5 00
4 50	18 28.5	98.0	19 16.2	97.4	20 03.8	96.7	20 51.1	96.1	21 38.5	95.4	4 50
40	19 57.7	100.1	20 45.6	99.4	21 33.2	98.8	22 20.8	98.1	23 08.2	97.5	40
30	21 26.3	102.2	22 14.3	101.5	23 02.2	100.9	23 49.9	100.3	24 37.5	99.6	30
20	22 54.2	104.3	23 42.5	103.7	24 30.5	103.0	25 18.5	102.4	26 06.2	101.7	20
10	24 21.1	106.5	25 09.6	105.8	25 58.0	105.2	26 46.1	104.5	27 34.2	103.9	10
4 00	25 47.2	108.7	26 36.0	108.0	27 24.6	107.4	28 13.2	106.7	29 01.4	106.1	4 00
3 50	27 12.2	111.0	28 01.4	110.3	28 50.2	109.7	29 39.1	109.0	30 27.7	108.3	3 50
40	28 35.7	113.3	29 25.3	112.6	30 14.6	112.0	31 03.8	111.3	31 52.8	110.6	40
30	29 57.9	115.6	30 47.8	115.0	31 37.7	114.3	32 27.2	113.6	33 16.7	113.0	30
20	31 18.5	118.0	32 09.0	117.4	32 59.2	116.7	33 49.2	116.1	34 39.0	115.4	20
10	32 37.3	120.5	33 28.2	119.8	34 18.9	119.2	35 09.3	118.6	35 59.8	117.9	10
3 00	33 54.1	123.0	34 45.5	122.3	35 36.7	121.7	36 27.7	121.1	37 18.5	120.4	3 00
2 50	35 08.7	125.6	36 00.7	124.9	36 52.4	124.3	37 44.0	123.7	38 35.3	123.0	2 50
40	36 20.9	128.2	37 13.4	127.6	38 05.8	127.0	38 57.9	126.4	39 49.9	125.7	40
30	37 30.5	130.9	38 23.6	130.3	39 16.5	129.7	40 09.3	129.1	41 01.9	128.5	30
20	38 37.3	133.7	39 31.0	133.1	40 24.6	132.5	41 18.0	131.9	42 11.2	131.3	20
10	39 41.0	136.6	40 35.3	136.0	41 29.5	135.4	42 23.5	134.9	43 17.3	134.3	10
2 00	40 41.4	139.5	41 36.4	139.0	42 31.2	138.4	43 25.9	137.9	44 20.4	137.3	2 00
1 50	41 38.2	142.5	42 33.7	142.0	43 29.2	141.5	44 24.6	141.0	45 19.8	140.4	1 50
40	42 31.1	145.6	43 27.4	145.2	44 23.5	144.7	45 19.5	144.2	46 15.4	143.6	40
30	43 20.1	148.8	44 16.8	148.4	45 13.6	147.9	46 10.2	147.4	47 06.8	146.9	30
20	44 04.5	152.0	45 02.0	151.6	45 59.4	151.2	46 56.6	150.8	47 53.7	150.3	20
10	44 44.6	155.3	45 42.3	155.0	46 40.4	154.6	47 38.2	154.2	48 36.0	153.8	10
1 00	45 19.8	158.7	46 18.2	158.4	47 16.6	158.1	48 15.0	157.7	49 13.3	157.4	1 00
0 50	45 49.9	162.2	46 48.9	161.9	47 47.7	161.6	48 46.6	161.3	49 45.4	161.0	0 50
40	46 14.9	165.7	47 14.2	165.5	48 13.5	165.2	49 12.0	165.0	50 12.0	164.7	40
30	46 34.5	169.2	47 34.1	169.1	48 33.7	168.9	49 33.2	168.7	50 32.8	168.5	30
20	46 48.6	172.8	47 48.5	172.7	48 48.3	172.6	49 48.1	172.4	50 47.9	172.3	20
10	46 57.3	176.4	47 57.2	176.3	48 57.0	176.3	49 57.0	176.2	50 56.9	176.1	10
0 00	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40							0 16.9	59.5	1 07.2	59.0	7 40
30					0 45.6	62.1	1 35.4	61.5	2 25.3	61.0	30
20	0 27.1	65.2	1 16.6	64.6	2 06.0	64.1	2 55.5	63.5	3 45.0	62.9	20
10	1 49.8	67.2	2 38.8	66.6	3 27.9	66.0	4 17.1	65.4	5 06.1	64.8	10
7 00	3 13.4	69.2	4 02.2	68.6	4 50.9	68.0	5 39.6	67.4	6 28.3	66.8	7 00
6 50	4 38.4	71.1	5 26.9	70.5	6 15.2	69.9	7 03.7	69.3	7 52.1	68.8	6 50
40	6 04.3	73.1	6 52.4	72.5	7 40.5	71.8	8 28.6	71.3	9 16.6	70.7	40
30	7 31.1	75.0	8 19.0	74.4	9 06.8	73.8	9 54.6	73.2	10 42.2	72.6	30
20	8 58.6	76.9	9 46.3	76.3	10 33.9	75.7	11 21.4	75.1	12 08.9	74.5	20
10	10 27.0	78.9	11 14.4	78.2	12 01.7	77.6	12 49.0	77.0	13 36.2	76.4	10
6 00	11 55.8	80.8	12 43.0	80.2	13 30.2	79.6	14 17.3	78.9	15 04.3	78.3	6 00
5 50	13 25.1	82.8	14 12.2	82.1	14 59.2	81.5	15 46.1	80.8	16 32.9	80.2	5 50
40	14 54.9	84.8	15 41.8	84.1	16 28.8	83.5	17 15.5	82.8	18 02.2	82.1	40
30	16 24.9	86.7	17 11.8	86.0	17 58.2	85.4	18 45.1	84.7	19 31.7	84.1	30
20	17 55.1	88.7	18 42.0	88.0	19 28.7	87.4	20 15.3	86.7	21 01.7	86.0	20
10	19 25.4	90.7	20 12.2	90.0	20 58.9	89.4	21 46.5	88.7	22 31.8	88.0	10
5 00	20 55.5	92.7	21 42.5	92.0	22 29.2	91.4	23 15.7	90.7	24 02.1	90.0	5 00
4 50	22 25.7	94.7	23 12.6	94.0	23 59.3	93.4	24 45.9	92.7	25 32.3	92.0	4 50
40	23 55.5	96.8	24 42.5	96.1	25 29.3	95.4	26 16.0	94.7	27 02.5	94.0	40
30	25 24.9	98.9	26 12.1	98.2	26 59.0	97.5	27 45.8	96.8	28 32.4	96.1	30
20	26 53.8	101.0	27 41.2	100.3	28 28.3	99.6	29 15.2	98.9	30 02.0	98.2	20
10	28 22.1	103.2	29 09.7	102.5	29 57.0	101.8	30 44.1	101.1	31 31.1	100.3	10
4 00	29 49.5	105.4	30 37.4	104.7	31 25.0	104.0	32 12.4	103.3	32 59.6	102.5	4 00
3 50	31 16.1	107.6	32 04.2	106.9	32 52.1	106.2	33 39.8	105.5	34 27.2	104.8	3 50
40	32 41.6	109.9	33 30.1	109.2	34 18.4	108.5	35 06.4	107.8	35 54.1	107.0	40
30	34 05.8	112.3	34 54.8	111.6	35 43.3	110.9	36 31.8	110.1	37 19.8	109.4	30
20	35 28.6	114.7	36 17.9	114.0	37 07.0	113.3	37 55.8	112.5	38 44.4	111.8	20
10	36 49.8	117.2	37 39.7	116.5	38 29.2	115.7	39 18.4	115.0	40 07.4	114.3	10
3 00	38 09.2	119.7	38 59.5	119.0	39 49.6	118.3	40 39.4	117.6	41 28.9	116.8	3 00
2 50	39 26.5	122.3	40 17.3	121.6	41 08.0	120.9	41 58.4	120.2	42 48.5	119.5	2 50
40	40 41.6	125.0	41 33.1	124.4	42 24.3	123.7	43 15.3	122.9	44 06.0	122.2	40
30	41 54.3	127.8	42 46.4	127.2	43 38.2	126.5	45 30.0	125.8	45 21.2	125.0	30
20	43 04.2	130.7	43 56.9	130.0	44 49.5	129.4	45 41.8	128.7	46 33.8	127.9	20
10	44 11.1	133.7	45 04.5	133.0	45 57.8	132.4	46 50.8	131.7	47 43.5	131.0	10
2 00	45 14.7	136.7	46 08.9	136.1	47 02.9	135.5	47 56.6	134.8	48 50.1	134.1	2 00
1 50	46 14.9	139.9	47 09.8	139.3	48 04.4	138.7	48 58.9	138.0	49 53.0	137.4	1 50
40	47 11.2	143.1	48 06.7	142.5	49 02.1	141.9	49 57.3	141.3	50 52.3	140.7	40
30	48 03.2	146.4	48 59.4	145.9	49 55.7	145.4	50 51.6	144.8	51 47.2	144.2	30
20	48 50.8	149.9	49 47.8	149.4	50 44.6	148.9	51 41.3	148.4	52 37.8	147.8	20
10	49 33.8	153.4	50 31.2	153.0	51 28.8	152.5	52 26.2	152.1	53 23.4	151.6	10
1 00	50 11.6	157.0	51 09.7	156.6	52 07.8	156.2	53 05.8	155.8	54 03.7	155.3	1 00
0 50	50 44.2	160.7	51 42.8	160.4	52 41.5	160.0	53 40.1	159.7	54 38.6	159.3	0 50
40	51 11.2	164.5	52 10.3	164.2	53 09.5	163.9	54 08.5	163.6	55 07.6	163.3	40
30	51 32.4	168.3	52 32.0	168.1	53 31.4	167.9	54 30.9	167.6	55 30.2	167.4	30
20	51 47.7	172.2	52 47.5	172.1	53 47.3	171.9	54 47.1	171.7	55 46.8	171.6	20
10	51 56.9	176.1	52 57.0	176.0	53 56.9	175.9	54 56.8	175.8	55 56.7	175.8	10
0 00	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00			0 18.2	54.0	1 09.4	53.4	2 00.6	52.9	2 51.8	52.4	8 00
7 50	0 41.4	56.5	1 32.1	55.9	2 22.7	55.4	3 13.5	54.8	4 04.2	54.3	7 50
40	1 57.4	58.5	2 47.7	57.9	3 38.0	57.4	4 28.3	56.8	5 18.4	56.2	40
30	3 15.2	60.4	4 05.0	59.9	4 54.7	59.3	5 44.6	58.7	6 34.3	58.2	30
20	4 34.4	62.4	5 23.8	61.8	6 13.2	61.2	7 02.5	60.6	7 51.8	60.0	20
10	5 55.1	64.3	6 44.1	63.7	7 32.8	63.1	8 21.8	62.5	9 10.7	61.9	10
7 00	7 16.9	66.2	8 05.6	65.6	8 54.2	65.0	9 42.6	64.4	10 31.1	63.8	7 00
6 50	8 40.2	68.1	9 28.4	67.5	10 16.6	66.9	11 04.7	66.3	11 52.8	65.7	6 50
40	10 04.5	70.0	10 52.4	69.4	11 40.3	68.8	12 28.0	68.2	13 15.6	67.6	40
30	11 29.9	71.9	12 17.4	71.3	13 04.8	70.7	13 52.2	70.1	14 39.6	69.5	30
20	12 56.2	73.8	13 43.4	73.2	14 30.6	72.6	15 17.6	71.9	16 04.6	71.3	20
10	14 23.3	75.7	15 10.2	75.1	15 57.1	74.4	16 43.8	73.8	17 30.6	73.2	10
6 00	15 51.5	77.6	16 37.9	77.0	17 24.5	76.3	18 11.0	75.7	18 57.3	75.0	6 00
5 50	17 19.6	79.5	18 06.2	78.9	18 52.5	78.2	19 38.8	77.5	20 24.9	76.8	5 50
40	18 48.7	81.5	19 35.0	80.8	20 21.2	80.1	21 07.3	79.4	21 53.1	78.7	40
30	20 18.1	83.4	21 04.3	82.7	21 50.3	82.0	22 36.2	81.3	23 21.9	80.6	30
20	21 48.0	85.3	22 34.1	84.6	23 20.0	83.9	24 05.7	83.2	24 51.2	82.5	20
10	23 18.1	87.3	24 04.0	86.6	24 49.8	85.8	25 35.4	85.1	26 20.9	84.4	10
5 00	24 48.3	89.3	25 34.2	88.6	26 20.0	87.8	27 05.6	87.1	27 50.9	86.4	5 00
4 50	26 18.6	91.3	27 04.4	90.5	27 50.2	89.8	28 35.8	89.1	29 21.1	88.3	4 50
40	27 48.7	93.3	28 34.8	92.6	29 20.5	91.8	30 06.1	91.1	30 51.4	90.3	40
30	29 18.7	95.4	30 04.7	94.6	30 50.7	93.9	31 36.2	93.1	32 21.5	92.4	30
20	30 48.5	97.5	31 34.7	96.7	32 20.6	96.0	33 06.3	95.2	33 51.7	94.4	20
10	32 17.7	99.6	33 04.0	98.8	33 50.2	98.1	34 36.0	97.3	35 21.6	96.5	10
4 00	33 46.5	101.8	34 33.1	101.0	35 19.3	100.3	36 05.4	99.5	36 51.0	98.7	4 00
3 50	35 14.4	104.0	36 01.2	103.2	36 47.8	102.4	37 34.1	101.6	38 20.0	100.8	3 50
40	36 41.6	106.3	37 28.8	105.5	38 15.6	104.7	39 02.1	103.9	39 48.3	103.1	40
30	38 07.7	108.6	38 55.2	107.8	39 42.4	107.0	40 29.2	106.2	41 15.9	105.4	30
20	39 32.6	111.0	40 20.5	110.2	41 08.1	109.4	41 55.4	108.6	42 42.3	107.8	20
10	40 56.2	113.5	41 44.5	112.7	42 32.6	111.9	43 20.2	111.1	44 07.7	110.3	10
3 00	42 18.1	116.1	43 07.0	115.3	43 55.6	114.5	44 43.8	113.7	45 31.7	112.9	3 00
2 50	43 38.2	118.7	44 27.7	117.9	45 16.8	117.1	46 05.6	116.3	46 54.1	115.5	2 50
40	44 56.4	121.4	45 46.5	120.6	46 36.2	119.8	47 25.6	119.0	48 14.7	118.2	40
30	46 12.2	124.3	47 03.0	123.5	47 53.4	122.7	48 43.4	121.8	49 33.2	121.0	30
20	47 25.6	127.2	48 17.0	126.4	49 08.2	125.6	49 59.0	124.8	50 49.4	124.0	20
10	48 36.0	130.3	49 28.2	129.5	50 20.0	128.7	51 11.6	127.9	52 02.9	127.1	10
2 00	49 43.4	133.4	50 36.3	132.7	51 29.0	131.9	52 21.3	131.1	53 13.3	130.3	2 00
1 50	50 47.1	136.7	51 40.7	136.0	52 34.4	135.2	53 27.5	134.5	54 20.5	133.7	1 50
40	51 47.1	140.1	52 41.6	139.4	53 36.0	138.7	54 30.0	138.0	55 23.8	137.3	40
30	52 43.0	143.6	53 38.2	142.9	54 33.4	142.3	55 28.3	141.6	56 23.1	141.0	30
20	53 34.2	147.2	54 30.4	146.6	55 26.4	146.0	56 22.1	145.4	57 17.7	144.8	20
10	54 20.6	151.0	55 17.2	150.5	56 14.2	149.9	57 10.9	149.3	58 07.3	148.7	10
1 00	55 01.5	154.9	55 59.2	154.4	56 56.8	153.9	57 54.2	153.4	58 41.5	152.8	1 00
0 50	55 37.0	158.9	56 35.2	158.5	57 33.5	158.0	58 31.6	157.6	59 29.6	157.1	0 50
40	56 06.5	163.0	57 05.4	162.7	58 04.2	162.3	59 02.9	161.9	60 01.6	161.5	40
30	56 29.7	167.2	57 29.0	166.9	58 28.2	166.6	59 27.6	166.3	60 27.0	166.1	30
20	56 46.5	171.4	57 46.2	171.2	58 45.9	171.0	59 45.6	170.8	60 45.2	170.6	20
10	56 56.6	175.7	57 56.5	175.6	58 56.3	175.5	59 56.4	175.4	60 56.2	175.3	10
0 00	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 30.2	92.0	0 42.3	92.6							5 50
40	3 00.4	94.0	2 12.5	94.6	1 24.4	95.2	0 36.4	95.8			40
30	4 30.4	96.0	3 42.2	96.6	2 54.2	97.2	2 06.1	97.8	1 17.9	98.4	30
20	5 59.9	98.0	5 11.7	98.6	4 23.5	99.2	3 35.2	99.8	2 46.9	100.4	20
10	7 29.1	100.0	6 40.8	100.6	5 52.3	101.2	5 03.9	101.8	4 15.4	102.4	10
5 00	8 57.7	102.1	8 09.1	102.7	7 20.5	103.3	6 31.9	103.9	5 43.2	104.5	5 00
4 50	10 25.6	104.1	9 36.8	104.7	8 48.0	105.3	7 59.2	105.9	7 10.2	106.5	4 50
40	11 52.7	106.2	11 03.7	106.8	10 14.6	107.4	9 25.5	108.0	8 36.3	108.6	40
30	13 18.9	108.3	12 29.6	108.9	11 40.3	109.5	10 50.9	110.1	10 01.4	110.6	30
20	14 44.1	110.4	13 54.5	111.0	13 04.8	111.6	12 15.1	112.2	11 25.2	112.7	20
10	16 08.0	112.5	15 18.1	113.1	14 28.1	113.7	13 38.1	114.3	12 47.8	114.8	10
4 00	17 30.7	114.7	16 40.5	115.3	15 50.1	115.9	14 59.6	116.5	14 09.0	117.0	4 00
3 50	18 51.9	116.9	18 01.2	117.5	17 10.5	118.1	16 19.6	118.7	15 28.7	119.2	3 50
40	20 11.6	119.2	19 20.5	119.8	18 29.3	120.3	17 38.0	120.9	16 46.6	121.4	40
30	21 29.5	121.5	20 38.0	122.1	19 46.2	122.6	18 54.6	123.1	18 02.7	123.6	30
20	22 45.5	123.8	21 53.5	124.4	21 01.4	124.9	20 09.1	125.4	19 16.8	125.9	20
10	23 59.4	126.2	23 06.9	126.7	22 14.4	127.2	21 21.7	127.7	20 28.8	128.2	10
3 00	25 11.1	128.6	24 18.2	129.1	23 25.1	129.6	22 31.9	130.1	21 38.5	130.6	3 00
2 50	26 20.4	131.1	25 26.9	131.6	24 33.2	132.1	23 39.6	132.6	22 45.8	133.0	2 50
40	27 27.1	133.6	26 33.1	134.1	25 39.0	134.6	24 44.8	135.1	23 50.4	135.5	40
30	28 31.1	136.2	27 36.6	136.6	26 41.9	137.1	25 47.2	137.6	24 52.2	138.0	30
20	29 32.1	138.8	28 37.0	139.2	27 41.8	139.7	26 46.6	140.1	25 51.2	140.5	20
10	30 30.1	141.4	29 34.4	141.8	28 38.7	142.3	27 42.9	142.7	26 47.0	143.1	10
2 00	31 24.7	144.1	30 28.6	144.5	29 32.3	144.9	28 35.9	145.3	27 39.5	145.7	2 00
1 50	32 15.8	146.9	31 19.1	147.3	30 22.3	147.6	29 25.6	148.0	28 28.6	148.4	1 50
40	33 03.2	149.7	32 06.1	150.1	31 08.8	150.4	30 11.5	150.8	29 14.1	151.1	40
30	33 46.7	152.6	32 49.1	152.9	31 51.4	153.2	30 53.7	153.6	29 55.8	153.9	30
20	34 26.3	155.5	33 28.2	155.8	32 30.0	156.1	31 31.8	156.4	30 33.6	156.7	20
10	35 01.5	158.5	34 03.1	158.7	33 04.5	159.0	32 05.9	159.2	31 07.3	159.5	10
1 00	35 32.5	161.5	34 33.6	161.7	33 34.7	161.9	32 35.8	162.1	31 36.8	162.4	1 00
0 50	35 59.0	164.5	34 59.8	164.7	34 00.5	164.9	33 01.3	165.1	32 02.0	165.3	0 50
40	36 20.8	167.6	35 21.3	167.7	34 21.8	167.9	33 22.3	168.0	32 22.7	168.2	40
30	36 37.9	170.7	35 38.2	170.8	34 38.5	170.9	33 38.8	171.0	32 39.0	171.1	30
20	36 50.1	173.8	35 50.3	173.8	34 50.4	173.9	33 50.5	174.0	32 50.6	174.1	20
10	36 57.5	176.9	35 57.5	176.9	34 57.6	176.9	33 57.7	177.0	32 57.7	177.0	10
0 00	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 29.8	99.0									5 30
20	1 58.6	101.0	1 10.3	101.6	0 22.0	102.2					20
10	3 26.9	103.0	2 38.5	103.6	1 49.9	104.2	1 01.3	104.8	0 12.9	105.3	10
5 00	4 54.5	105.0	4 05.7	105.6	3 17.0	106.2	2 28.2	106.8	1 39.4	107.4	5 00
4 50	6 21.2	107.0	5 32.3	107.6	4 43.2	108.2	3 54.1	108.8	3 05.1	109.4	4 50
40	7 47.0	109.1	6 57.8	109.7	6 08.4	110.3	5 19.1	110.8	4 29.7	111.4	40
30	9 11.8	111.2	8 22.2	111.8	7 32.5	112.3	6 42.8	112.9	5 53.1	113.4	30
20	10 35.3	113.3	9 45.4	113.9	8 55.4	114.4	8 05.4	115.0	7 15.3	115.5	20
10	11 57.6	115.4	11 07.2	116.0	10 16.9	116.5	9 26.4	117.1	8 36.0	117.6	10
4 00	13 18.4	117.6	12 27.7	118.1	11 36.9	118.6	10 46.0	119.2	9 55.1	119.7	4 00
3 50	14 37.6	119.7	13 46.5	120.3	12 55.3	120.8	12 04.1	121.3	11 12.8	121.8	3 50
40	15 55.1	121.9	15 03.6	122.5	14 11.9	123.0	13 20.3	123.5	12 28.5	124.0	40
30	17 10.8	124.2	16 18.8	124.7	15 26.6	125.2	14 34.5	125.7	13 42.3	126.2	30
20	18 24.4	126.5	17 32.0	127.0	16 39.5	127.5	15 46.7	128.0	14 54.0	128.5	20
10	19 35.9	128.8	18 43.0	129.3	17 49.9	129.8	16 56.7	130.3	16 03.6	130.7	10
3 00	20 45.2	131.1	19 51.7	131.6	18 58.2	132.1	18 04.5	132.6	17 10.8	133.0	3 00
2 50	21 51.9	133.5	20 57.9	134.0	20 03.9	134.5	19 09.6	134.9	18 15.6	135.3	2 50
40	22 56.0	136.0	22 01.6	136.4	21 07.0	136.9	20 12.3	137.3	19 17.6	137.7	40
30	23 57.4	138.4	23 02.3	138.9	22 07.2	139.3	21 12.1	139.7	20 16.9	140.1	30
20	24 55.8	140.9	24 00.2	141.4	23 04.6	141.8	22 09.0	142.2	21 13.3	142.6	20
10	25 51.1	143.5	24 55.0	143.9	23 58.9	144.3	23 02.7	144.7	22 06.6	145.1	10
2 00	26 43.1	146.1	25 46.6	146.5	24 50.0	146.9	23 53.4	147.2	22 56.7	147.6	2 00
1 50	27 31.7	148.8	26 34.7	149.1	25 37.6	149.5	24 40.5	149.8	23 43.4	150.1	1 50
40	28 16.7	151.5	27 19.2	151.8	26 21.7	152.1	25 24.1	152.4	24 26.6	152.7	40
30	28 57.9	154.2	28 00.0	154.5	27 02.2	154.8	26 04.1	155.0	25 06.1	155.3	30
20	29 35.3	156.9	28 37.0	157.2	27 38.7	157.5	26 40.2	157.7	25 41.8	158.0	20
10	30 08.7	159.7	29 09.9	160.0	28 11.2	160.2	27 12.5	160.4	26 13.8	160.7	10
1 00	30 37.8	162.6	29 38.7	162.8	28 39.7	163.0	27 40.6	163.2	26 41.6	163.4	1 00
0 50	31 02.7	165.4	30 03.3	165.6	29 04.1	165.8	28 04.7	165.9	27 05.5	166.1	0 50
40	31 23.2	168.3	30 23.7	168.5	29 24.1	168.6	28 24.6	168.7	27 25.0	168.9	40
30	31 39.2	171.2	30 39.5	171.3	29 39.7	171.4	28 39.9	171.5	27 40.2	171.6	30
20	31 50.7	174.1	30 50.9	174.2	29 51.0	174.3	28 51.1	174.3	27 51.2	174.4	20
10	31 57.8	177.0	30 57.8	177.1	29 57.8	177.1	28 57.8	177.1	27 57.8	177.2	10
0 00	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 50.6	108.0	0 01.8	108.5							5 00
4 50	2 15.9	110.0	1 26.9	110.5	0 37.7	111.1					4 50
40	3 40.3	112.0	2 50.8	112.5	2 01.4	113.1	1 11.9	113.7	0 22.4	114.3	40
30	5 03.4	114.0	4 13.6	114.5	3 23.8	115.1	2 33.9	115.7	1 44.1	116.3	30
20	6 25.2	116.1	5 35.0	116.6	4 44.8	117.2	3 54.6	117.7	3 04.3	118.3	20
10	7 45.4	118.2	6 54.9	118.7	6 04.3	119.2	5 13.7	119.8	4 23.1	120.3	10
4 00	9 04.2	120.3	8 13.3	120.8	7 22.3	121.3	6 31.2	121.9	5 40.1	122.4	4 00
3 50	10 21.4	122.4	9 30.0	122.9	8 38.4	123.4	7 47.0	124.0	6 55.5	124.5	3 50
40	11 36.6	124.6	10 44.8	125.1	9 52.9	125.6	9 00.9	126.1	8 08.9	126.6	40
30	12 50.0	126.8	11 57.6	127.3	11 05.3	127.7	10 12.8	128.2	9 20.4	128.7	30
20	14 01.3	129.0	13 08.5	129.5	12 15.6	129.9	11 22.7	130.4	10 29.7	130.9	20
10	15 10.4	131.2	14 17.1	131.7	13 23.7	132.1	12 30.1	132.6	11 36.8	133.1	10
3 00	16 17.0	133.5	15 23.2	134.0	14 29.4	134.4	13 35.5	134.9	12 41.5	135.3	3 00
2 50	17 21.3	135.8	16 27.0	136.3	15 32.6	136.7	14 38.1	137.1	13 43.7	137.6	2 50
40	18 22.9	138.2	17 28.1	138.6	16 33.2	139.0	15 38.3	139.4	14 43.3	139.9	40
30	19 21.6	140.6	18 26.4	141.0	17 31.0	141.4	16 35.6	141.8	15 40.1	142.2	30
20	20 17.6	143.0	19 21.7	143.4	18 25.9	143.8	17 30.0	144.1	16 34.1	144.5	20
10	21 10.4	145.4	20 13.1	145.8	19 17.6	146.2	18 21.3	146.5	17 24.9	146.9	10
2 00	22 00.0	147.9	21 03.2	148.3	20 06.4	148.6	19 09.6	148.9	18 12.7	149.3	2 00
1 50	22 46.2	150.4	21 48.9	150.8	20 51.6	151.1	19 54.6	151.4	18 57.1	151.7	1 50
40	23 28.9	153.0	22 31.3	153.3	21 33.6	153.6	20 35.8	153.9	19 38.1	154.2	40
30	24 08.2	155.6	23 10.0	155.9	22 11.9	156.1	21 13.8	156.4	20 15.7	156.7	30
20	24 43.4	158.2	23 45.0	158.5	22 46.5	158.7	21 48.0	159.0	20 49.2	159.2	20
10	25 15.1	160.9	24 16.1	161.1	23 17.4	161.3	22 18.5	161.5	21 19.8	161.7	10
1 00	25 42.5	163.6	24 43.4	163.8	23 44.3	164.0	22 45.1	164.1	21 46.0	164.3	1 00
0 50	26 06.0	166.3	25 06.7	166.4	24 07.3	166.6	23 07.9	166.7	22 08.5	166.9	0 50
40	26 25.4	169.0	25 25.8	169.1	24 26.2	169.3	23 26.6	169.4	22 27.0	169.5	40
30	26 40.5	171.7	25 40.7	171.8	24 40.9	171.9	23 41.1	172.0	22 41.4	172.1	30
20	26 51.3	174.5	25 51.5	174.5	24 51.6	174.6	23 51.7	174.7	22 51.8	174.7	20
10	26 57.8	177.2	25 57.9	177.2	24 57.9	177.3	23 57.9	177.3	22 57.9	177.3	10
0 00	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	0 54.1	116.8	0 04.2	117.4							4 30
20	2 14.0	118.8	1 23.7	119.4	0 33.5	119.9	0 16.9				20
10	3 32.3	120.8	2 41.6	121.4	1 50.8	121.9	1 00.1	122.4	0 09.4	123.0	10
4 00	4 49.0	122.9	3 57.8	123.5	3 06.7	124.0	2 15.5	124.5	1 24.3	125.0	4 00
3 50	6 02.8	125.0	5 12.1	125.5	4 20.6	126.0	3 28.9	126.5	2 37.2	127.0	3 50
40	7 16.9	127.1	6 24.8	127.6	5 32.7	128.1	4 40.5	128.6	3 48.4	129.1	40
30	8 27.9	129.2	7 35.2	129.7	6 42.7	130.2	5 50.0	130.7	4 57.4	131.2	30
20	9 36.7	131.4	8 43.6	131.9	7 50.6	132.3	6 57.4	132.8	6 04.3	133.3	20
10	10 43.2	133.6	9 49.7	134.0	8 56.1	134.4	8 02.4	134.9	7 08.8	135.4	10
3 00	11 47.5	135.8	10 53.5	136.2	9 59.3	136.6	9 05.2	137.1	8 11.1	137.5	3 00
2 50	12 49.1	138.0	11 54.6	138.4	11 00.1	138.8	10 05.4	139.3	9 10.7	139.7	2 50
40	13 48.3	140.3	12 53.2	140.7	11 58.1	141.1	11 03.0	141.5	10 07.8	141.9	40
30	14 44.6	142.6	13 49.0	143.0	12 53.5	143.3	11 57.8	143.7	11 02.2	144.1	30
20	15 38.1	144.9	14 42.0	145.3	13 45.9	145.6	12 49.9	146.0	11 53.7	146.3	20
10	16 28.4	147.2	15 31.9	147.6	14 35.4	147.9	13 38.8	148.3	12 42.2	148.6	10
2 00	17 15.8	149.6	16 18.7	150.0	15 21.7	150.3	14 24.7	150.6	13 27.7	150.9	2 00
1 50	17 59.7	152.0	17 02.2	152.4	16 04.9	152.6	15 07.4	152.9	14 10.0	153.2	1 50
40	18 40.3	154.5	17 42.5	154.8	16 44.7	155.0	15 46.8	155.3	14 48.9	155.6	40
30	19 17.4	157.0	18 19.1	157.2	17 21.1	157.4	16 22.8	157.7	15 24.5	158.0	30
20	19 51.0	159.4	18 52.4	159.7	17 53.9	159.9	16 55.3	160.1	15 56.7	160.4	20
10	20 20.8	161.9	19 21.9	162.2	18 23.0	162.4	17 24.1	162.5	16 25.2	162.8	10
1 00	20 46.9	164.5	19 47.7	164.7	18 48.5	164.9	17 49.4	165.0	16 50.2	165.2	1 00
0 50	21 09.0	167.0	20 09.6	167.2	19 10.2	167.4	18 10.8	167.5	17 11.4	167.6	0 50
40	21 27.4	169.6	20 27.7	169.7	19 28.1	169.9	18 28.5	170.0	17 28.8	170.1	40
30	21 41.5	172.2	20 41.8	172.3	19 41.9	172.4	18 42.1	172.5	17 42.4	172.6	30
20	21 51.8	174.8	20 51.9	174.9	19 52.0	174.9	18 52.1	175.0	17 52.2	175.0	20
10	21 57.9	177.4	20 58.0	177.4	19 58.0	177.4	18 58.0	177.5	17 58.1	177.5	10
0 00	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 00	0 33.1	125.5									4 00
3 50	1 45.6	127.5	0 54.0	128.1	0 02.2	128.5					3 50
40	2 56.2	129.6	2 04.0	130.1	1 11.8	130.6	0 19.6	131.1			40
30	4 04.7	131.6	3 12.0	132.1	2 19.3	132.6	1 26.6	133.1	0 34.0	133.6	30
20	5 11.1	133.7	4 17.9	134.2	3 24.7	134.7	2 31.4	135.1	1 38.2	135.6	20
10	6 15.2	135.8	5 21.5	136.3	4 27.7	136.7	3 34.0	137.2	2 40.2	137.7	10
3 00	7 16.9	138.0	6 22.7	138.4	5 28.4	138.8	4 34.2	139.2	3 39.9	139.7	3 00
2 50	8 16.1	140.1	7 21.4	140.5	6 26.6	140.9	5 31.9	141.3	4 37.1	141.8	2 50
40	9 12.7	142.3	8 17.4	142.7	7 22.2	143.1	6 26.9	143.5	5 31.6	143.9	40
30	10 06.6	144.5	9 10.8	144.8	8 15.1	145.2	7 19.3	145.6	6 23.7	146.0	30
20	10 57.6	146.7	10 01.4	147.0	9 05.2	147.4	8 09.0	147.8	7 12.7	148.1	20
10	11 45.6	149.0	10 49.0	149.3	9 52.3	149.6	8 55.6	150.0	7 59.0	150.3	10
2 00	12 30.6	151.3	11 33.6	151.6	10 36.4	151.9	9 39.3	152.2	8 42.1	152.5	2 00
1 50	13 12.4	153.6	12 15.0	153.8	11 17.4	154.1	10 19.8	154.4	9 22.3	154.7	1 50
40	13 51.0	155.9	12 53.1	156.1	11 55.1	156.4	10 57.2	156.6	9 59.2	156.9	40
30	14 26.3	158.2	13 28.0	158.4	12 29.7	158.7	11 31.4	158.9	10 33.1	159.1	30
20	14 58.1	160.6	13 59.5	160.8	13 00.8	161.0	12 02.1	161.2	11 03.4	161.4	20
10	15 26.4	163.0	14 27.3	163.1	13 28.4	163.3	12 29.4	163.5	11 30.5	163.7	10
1 00	15 51.0	165.4	14 51.7	165.5	13 52.5	165.7	12 53.3	165.9	11 54.0	166.0	1 00
0 50	16 12.0	167.8	15 12.5	167.9	14 13.1	168.0	13 13.5	168.2	12 14.1	168.3	0 50
40	16 29.2	170.2	15 29.5	170.3	14 29.9	170.4	13 30.2	170.5	12 30.5	170.6	40
30	16 42.7	172.6	15 42.8	172.7	14 43.0	172.8	13 43.2	172.9	12 43.4	173.0	30
20	16 52.3	175.1	15 52.4	175.2	14 52.5	175.2	13 52.5	175.3	12 52.6	175.3	20
10	16 58.1	177.5	15 58.1	177.6	14 58.1	177.6	13 58.2	177.6	12 58.2	177.6	10
0 00	17 0.0	180.0	16 0.0	180.0	15 0.0	180.0	14 0.0	180.0	13 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 18.4	83.7	6 20
10					0 08.9	86.9	0 57.6	86.2	1 46.1	85.6	10
6 00	0 00.0	90.0	0 48.5	89.4	1 37.1	88.8	2 25.6	88.2	3 14.1	87.7	6 00
5 50	1 28.2	92.0	2 16.8	91.4	3 05.2	90.8	3 53.8	90.2	4 42.2	89.7	5 50
40	2 56.2	94.0	3 44.8	93.5	4 33.4	92.9	5 21.9	92.3	6 10.4	91.7	40
30	4 24.0	96.0	5 12.8	95.5	6 01.2	94.9	6 49.9	94.3	7 38.4	93.7	30
20	5 51.5	98.1	6 40.3	97.5	7 29.0	97.0	8 17.7	96.4	9 06.3	95.8	20
10	7 18.6	100.1	8 07.4	99.6	8 56.2	99.0	9 45.2	98.4	10 33.8	97.8	10
5 00	8 45.0	102.2	9 34.1	101.7	10 23.1	101.1	11 12.1	100.5	12 01.0	99.9	5 00
4 50	10 10.8	104.3	11 00.2	103.7	11 49.2	103.2	12 38.4	102.5	13 27.6	102.0	4 50
40	11 35.8	106.4	12 25.3	105.8	13 14.8	105.3	14 04.1	104.7	14 53.4	104.1	40
30	12 59.9	108.5	13 49.8	108.0	14 39.4	107.4	15 29.0	106.8	16 18.6	106.2	30
20	14 23.0	110.7	15 13.1	110.1	16 03.0	109.5	16 52.9	108.9	17 42.7	108.4	20
10	15 44.4	112.8	16 35.2	112.3	17 25.5	111.7	18 15.8	111.1	19 05.8	110.6	10
4 00	17 05.5	115.0	17 56.2	114.5	18 46.9	113.9	19 37.4	113.3	20 27.8	112.8	4 00
3 50	18 24.6	117.2	19 15.8	116.7	20 06.8	116.1	20 57.6	115.5	21 48.3	115.0	3 50
40	19 42.1	119.5	20 33.6	119.0	21 25.1	118.4	22 16.4	117.9	23 07.6	117.3	40
30	20 58.0	121.8	21 50.0	121.3	22 41.7	120.7	23 33.5	120.2	24 25.1	119.6	30
20	22 11.9	124.2	23 04.3	123.6	23 56.6	123.1	24 48.4	122.6	25 40.8	122.0	20
10	23 23.8	126.6	24 16.8	126.0	25 09.3	125.5	26 02.0	125.0	26 54.5	124.4	10
3 00	24 33.6	129.0	25 26.9	128.5	26 20.1	128.0	27 13.1	127.4	28 06.1	126.9	3 00
2 50	25 40.8	131.5	26 34.7	131.0	27 28.3	130.5	28 21.9	129.9	19 15.4	129.4	2 50
40	26 45 6	134.0	27 39.9	133.5	28 34.2	133.0	29 28.3	132.5	30 22.3	132.0	40
30	27 47.7	136.5	28 42.6	136.1	29 37.2	135.6	30 31.9	135.1	31 26.4	134.6	30
20	28 46.9	139.1	29 42.3	138.7	30 37.5	138.2	31 32.7	137.8	32 27.8	137.3	20
10	29 43.0	141.8	30 38.8	141.4	31 34.7	140.9	32 30.4	140.5	33 26.0	140.0	10
2 00	30 36.0	144.5	31 32.3	144.1	32 28.6	143.7	33 24.8	143.3	34 20.9	142.8	2 00
1 50	31 25.4	147.2	32 22.3	146.9	33 19.2	146.5	34 15.8	146.1	35 12.3	145.7	1 50
40	32 11.4	150.0	33 08.7	149.7	34 06.0	149.3	35 03.2	149.0	36 00.3	148.6	40
30	32 53.4	152.9	33 51.2	152.6	34 48.9	152.2	35 46.7	151.9	36 44.2	151.6	30
20	33 31.6	155.8	34 29.8	155.5	35 28.0	155.2	36 26.1	154.9	37 24.2	154.6	20
10	34 05.7	158.7	35 04.4	158.4	36 02.8	158.1	37 01.4	157.9	37 59.9	157.6	10
1 00	34 35.6	161.7	35 34.6	161.5	36 33.5	161.2	37 32.4	161.0	38 31.3	160.7	1 00
0 50	35 01.2	164.7	36 00.4	164.5	36 59.7	164.3	37 58.8	164.1	38 58.1	163.9	0 50
40	35 22.2	167.7	36 21.7	167.6	37 21.2	167.4	38 20.7	167.2	39 20.2	167.1	40
30	35 38.7	170.7	36 38.4	170.6	37 38.1	170.5	38 37.8	170.4	39 37.5	170.3	30
20	35 50.5	173.8	36 50.4	173.8	37 50.3	173.7	38 50.1	173.6	39 50.0	173.5	20
10	35 57.6	176.9	36 57.6	176.9	37 57.6	176.8	38 57.5	176.8	39 57.4	176.7	10
0 00	36 0.0	180.0	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 03.1	74.6	6 50
40							0 39.6	77.3	1 28.5	76.7	40
30			0 28.4	80.4	1 17.2	79.8	2 06.0	79.3	2 54.6	78.7	30
20	1 07.0	83.0	1 55.6	82.4	2 44.2	81.8	3 32.8	81.3	4 21.4	80.7	20
10	2 34.7	85.0	3 23.2	84.4	4 11.7	83.9	5 00.2	83.3	5 48.6	82.7	10
6 00	4 02.6	87.1	4 51.1	86.5	5 39.5	85.9	6 27.9	85.3	7 16.2	84.7	6 00
5 50	5 30.7	89.1	6 19.2	88.5	7 07.5	87.9	7 55.9	87.3	8 44.1	86.7	5 50
40	6 58.9	91.1	7 47.3	90.5	8 35.7	89.9	9 24.0	89.3	10 12.2	88.7	40
30	8 27.0	93.1	9 15.5	92.5	10 03.8	91.9	10 52.1	91.3	11 40.1	90.7	30
20	9 54.9	95.2	10 43.4	94.6	11 31.9	94.0	12 20.3	93.4	13 08.6	92.8	20
10	11 22.6	97.2	12 11.2	96.6	12 59.7	96.0	13 48.2	95.4	14 36.5	94.8	10
5 00	12 49.8	99.3	13 38.5	98.7	14 27.2	98.1	15 15.7	97.5	16 04.2	96.9	5 00
4 50	14 16.5	101.4	15 05.6	100.8	15 54.3	100.2	16 42.9	99.6	17 31.5	99.0	4 50
40	15 42.6	103.5	16 31.8	102.9	17 20.8	102.3	18 09.7	101.7	18 58.4	101.1	40
30	17 07.9	105.6	17 57.3	105.0	18 46.5	104.4	19 35.6	103.8	20 24.5	103.2	30
20	18 32.4	107.8	19 22.0	107.2	20 11.5	106.6	21 00.9	106.0	21 50.1	105.4	20
10	19 55.8	110.0	20 45.8	109.4	21 35.5	108.8	22 25.1	108.2	23 14.5	107.6	10
4 00	21 18.1	112.2	22 08.3	111.6	22 58.4	111.0	23 48.3	110.4	24 38.1	109.8	4 00
3 50	22 39.1	114.4	23 29.7	113.9	24 20.1	113.3	25 10.3	112.7	26 00.3	112.1	3 50
40	23 58.7	116.7	24 49.6	116.2	25 40.4	115.6	26 31.0	115.0	27 21.5	114.4	40
30	25 16.6	119.1	26 07.9	118.5	26 59.0	117.9	27 50.2	117.3	28 41.1	116.7	30
20	26 32.7	121.5	27 24.5	120.9	28 16.1	120.3	29 07.6	119.7	29 59.0	119.1	20
10	27 46.9	123.9	28 39.2	123.3	29 31.3	122.8	30 23.2	122.2	31 14.9	121.6	10
3 00	28 59.0	126.4	29 51.7	125.8	30 44.3	125.3	31 36.8	124.7	32 29.1	124.1	3 00
2 50	30 08.9	128.9	31 02.1	128.4	31 55.2	127.8	32 48.2	127.3	33 40.8	126.7	2 50
40	31 16.2	131.5	32 10.7	131.0	33 03.6	130.4	33 57.1	129.9	34 50.4	129.3	40
30	32 20.9	134.1	33 15.2	133.6	34 09.3	133.1	35 03.4	132.6	35 57.2	132.0	30
20	33 22.7	136.8	34 17.6	136.3	35 12.3	135.8	36 06.9	135.3	37 01.3	134.8	20
10	34 21.5	139.5	35 16.8	139.1	36 12.1	138.6	37 07.4	138.1	38 02.3	137.6	10
2 00	35 17.0	142.4	36 12.9	142.0	37 08.8	141.5	38 04.5	141.0	39 00.1	140.6	2 00
1 50	36 09.0	145.3	37 05.5	144.9	38 01.8	144.4	38 58.2	144.0	39 54.3	143.5	1 50
40	36 57.4	148.2	37 54.4	147.8	38 51.3	147.4	39 48.1	147.0	40 44.8	146.6	40
30	37 41.8	151.2	38 39.3	150.8	39 36.7	150.5	40 34.0	150.1	41 31.4	149.7	30
20	38 22.2	154.3	39 20.2	153.9	40 18.2	153.6	41 16.0	153.2	42 13.8	152.9	20
10	38 58.4	157.3	39 56.8	157.0	40 55.2	156.7	41 53.5	156.4	42 51.7	156.1	10
1 00	39 30.2	160.5	40 29.0	160.2	41 27.8	160.0	42 26.5	159.7	43 25.2	159.4	1 00
0 50	39 57.2	163.7	40 56.4	163.4	41 55.5	163.2	42 54.7	163.0	43 53.7	162.7	0 50
40	40 19.7	166.9	41 19.1	166.7	42 18.6	166.5	43 18.0	166.3	44 17.4	166.1	40
30	40 37.2	170.1	41 37.0	170.0	42 36.7	169.9	43 36.3	169.7	44 35.8	169.5	30
20	40 49.9	173.4	41 49.8	173.3	42 49.6	173.2	43 49.5	173.1	44 49.3	173.0	20
10	40 57.5	176.7	41 57.5	176.6	42 57.4	176.6	43 57.3	176.5	44 57.3	176.5	10
0 00	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20									0 02.3	65.8	7 20
10							0 33.6	68.3	1 23.1	67.8	10
7 00			0 17.3	71.5	1 06.7	70.9	1 56.1	70.3	2 45.4	69.8	7 00
6 50	0 52.3	74.1	1 41.4	73.5	2 30.5	72.9	3 19.6	72.3	4 08.7	71.8	6 50
40	2 17.4	76.1	3 06.3	75.5	3 55.2	74.9	4 44.1	74.3	5 32.9	73.8	40
30	3 43.4	78.1	4 32.1	77.5	5 20.6	76.9	6 09.3	76.3	6 57.9	75.7	30
20	5 09.9	80.1	5 58.4	79.5	6 46.9	78.9	7 35.3	78.3	8 23.8	77.7	20
10	6 37.1	82.1	7 25.5	81.5	8 13.7	80.9	9 02.0	80.3	9 51.2	79.7	10
6 00	8 04.6	84.1	8 52.8	83.5	9 41.0	82.9	10 29.1	82.3	11 17.2	81.7	6 00
5 50	9 32.4	86.1	10 20.6	85.5	11 08.6	84.9	11 56.7	84.3	12 44.7	83.6	5 50
40	11 00.4	88.1	11 48.6	87.5	12 36.6	86.9	13 24.5	86.3	14 12.4	85.6	40
30	12 28.6	90.1	13 16.7	89.5	14 04.6	88.9	14 52.6	88.3	15 40.4	87.6	30
20	13 56.7	92.1	14 44.8	91.5	15 32.8	90.9	16 20.7	90.3	17 08.5	89.7	20
10	15 24.8	94.1	16 12.9	93.6	17 01.0	92.9	17 48.9	92.3	18 36.7	91.7	10
5 00	16 52.5	96.2	17 40.8	95.6	18 28.9	95.0	19 16.9	94.4	20 04.8	93.7	5 00
4 50	18 20.1	98.3	19 08.4	97.7	19 56.6	97.1	20 44.7	96.4	21 32.7	95.8	4 50
40	19 47.1	100.4	20 35.6	99.8	21 23.9	99.2	22 12.1	98.5	23 00.2	97.9	40
30	21 13.4	102.5	22 02.1	101.9	22 50.6	101.3	23 39.1	100.6	24 27.3	100.0	30
20	22 39.1	104.7	23 28.1	104.1	24 16.8	103.5	25 05.4	102.8	25 53.8	102.2	20
10	24 03.8	106.9	24 52.9	106.3	25 42.1	105.7	26 30.9	105.0	27 19.6	104.4	10
4 00	25 27.7	109.2	26 17.1	108.5	27 06.4	107.9	27 55.6	107.2	28 44.5	106.6	4 00
3 50	26 50.4	111.4	27 40.2	110.8	28 29.8	110.2	29 19.2	109.5	30 08.5	108.9	3 50
40	28 11.8	113.8	29 02.0	113.1	29 51.9	112.5	30 41.7	111.9	31 31.4	111.2	40
30	29 31.8	116.1	30 22.3	115.5	31 12.7	114.9	32 02.9	114.2	32 52.9	113.6	30
20	30 50.2	118.5	31 41.2	117.9	32 32.0	117.3	33 22.6	116.7	34 13.0	116.0	20
10	32 06.7	121.0	32 58.1	120.4	33 49.3	119.8	34 40.4	119.2	35 31.4	118.5	10
3 00	33 21.2	123.5	34 13.1	122.9	35 04.9	122.3	35 56.5	121.7	36 47.9	121.1	3 00
2 50	34 33.6	126.1	35 26.1	125.5	36 18.4	124.9	37 10.4	124.3	38 02.3	123.7	2 50
40	35 43.6	128.8	36 36.6	128.2	37 29.4	127.6	38 22.1	127.0	39 14.6	126.4	40
30	36 51.0	131.5	37 44.6	130.9	38 37.9	130.4	39 31.1	129.8	40 24.2	129.2	30
20	37 55.6	134.3	38 49.8	133.7	39 43.8	133.2	40 37.6	132.6	41 31.3	132.0	20
10	38 57.2	137.2	39 52.0	136.6	40 46.5	136.1	41 40.9	135.5	42 35.2	134.9	10
2 00	39 55.6	140.1	40 50.9	139.6	41 46.1	139.0	42 41.2	138.5	43 36.1	137.9	2 00
1 50	40 50.4	143.1	41 46.3	142.6	42 42.1	142.1	43 37.8	141.6	44 39.4	141.0	1 50
40	41 41.5	146.1	42 38.0	145.7	43 34.4	145.2	44 30.7	144.8	45 26.9	144.2	40
30	42 28.5	149.3	43 25.7	148.9	44 22.6	148.4	45 19.5	148.0	46 16.2	147.5	30
20	43 11.4	152.5	44 09.1	152.1	45 06.6	151.7	46 04.1	151.3	47 01.4	150.9	20
10	43 50.0	155.8	44 48.1	155.4	45 46.1	155.1	46 44.1	154.7	47 42.0	154.3	10
1 00	44 23.8	159.1	45 22.4	158.8	46 20.9	158.5	47 19.4	158.2	48 17.8	157.8	1 00
0 50	44 52.8	162.5	45 51.8	162.3	46 50.8	162.0	47 49.7	161.7	48 48.5	161.4	0 50
40	45 16.7	165.9	46 16.1	165.7	47 15.4	165.5	48 14.7	165.3	49 14.0	165.1	40
30	45 35.5	169.4	46 35.2	169.3	47 34.8	169.1	48 34.4	168.9	49 34.0	168.8	30
20	45 49.1	172.9	46 48.9	172.8	47 48.7	172.7	48 48.5	172.6	49 48.4	172.5	20
10	45 57.3	176.4	46 57.3	176.4	47 57.2	176.3	48 57.1	176.3	49 57.1	176.2	10
0 00	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 50									0 23.3	57.0	7 50
40							0 47.3	59.5	1 38.1	59.0	40
30			0 23.3	62.6	1 15.7	62.1	2 04.1	61.5	2 54.4	61.0	30
20	0 52.3	65.2	1 42.3	64.6	2 32.3	64.1	3 22.3	63.5	4 12.3	63.0	20
10	2 12.9	67.2	3 02.7	66.6	3 52.8	66.1	4 41.8	65.5	5 31.5	65.0	10
7 00	3 34.8	69.2	4 24.1	68.6	5 13.4	68.1	6 02.7	67.5	6 51.9	66.9	7 00
6 50	4 57.8	71.2	5 46.8	70.6	6 35.8	70.0	7 24.7	69.4	8 13.6	68.9	6 50
40	6 21.7	73.2	7 10.5	72.6	7 59.2	72.0	8 47.9	71.4	9 36.5	70.8	40
30	7 46.5	75.1	8 35.1	74.5	9 23.4	74.0	10 11.8	73.4	11 00.1	72.8	30
20	9 12.1	77.1	10 00.4	76.5	10 48.6	75.9	11 36.7	75.3	12 24.8	74.7	20
10	10 39.4	79.1	11 26.4	78.4	12 14.4	77.8	13 02.4	77.2	13 50.2	76.6	10
6 00	12 05.2	81.1	12 53.1	80.4	13 40.9	79.8	14 28.6	79.2	15 16.3	78.6	6 00
5 50	13 32.5	83.0	14 20.4	82.4	15 08.0	81.7	15 55.5	81.1	16 43.0	80.5	5 50
40	15 00.2	85.0	15 47.8	84.4	16 35.4	83.7	17 22.8	83.1	18 10.2	82.5	40
30	16 28.3	87.0	17 15.7	86.4	18 03.1	85.7	18 50.5	85.1	19 37.7	84.4	30
20	17 56.2	89.0	18 43.8	88.4	19 31.2	87.7	20 18.5	87.1	21 05.6	86.4	20
10	19 24.4	91.0	20 12.0	90.4	20 59.4	89.7	21 46.6	89.1	22 33.7	88.4	10
5 00	20 52.5	93.1	21 40.1	92.4	22 27.5	91.8	23 14.8	91.1	24 01.9	90.4	5 00
4 50	22 20.5	95.2	23 08.1	94.5	23 55.7	93.8	24 42.8	93.1	25 30.0	92.4	4 50
40	23 48.1	97.2	24 35.8	96.6	25 23.4	95.9	26 10.8	95.2	26 58.0	94.5	40
30	25 15.2	99.4	26 03.3	98.7	26 50.9	98.0	27 38.4	97.3	28 25.7	96.6	30
20	26 42.1	101.5	27 30.1	100.8	28 18.0	100.2	29 05.6	99.5	29 53.1	98.8	20
10	28 08.1	103.7	28 56.4	103.0	29 44.4	102.3	30 32.3	101.7	31 20.0	100.9	10
4 00	29 33.3	105.9	30 21.9	105.2	31 10.3	104.6	31 58.4	103.9	32 46.3	103.1	4 00
3 50	30 57.6	108.2	31 46.5	107.5	32 35.1	106.8	33 23.5	106.1	34 11.7	105.4	3 50
40	32 20.8	110.5	33 10.0	109.8	33 59.0	109.1	34 47.7	108.4	35 36.2	107.7	40
30	33 42.8	112.9	34 32.3	112.2	35 21.7	111.5	36 10.8	110.8	36 59.6	110.1	30
20	35 03.2	115.3	35 53.1	114.6	36 42.9	113.9	37 32.4	113.2	38 21.7	112.5	20
10	36 22.0	117.8	37 12.5	117.1	38 02.7	116.4	38 52.8	115.7	39 42.5	115.0	10
3 00	37 39.1	120.4	38 30.1	119.7	39 20.8	119.0	40 11.3	118.3	41 01.5	117.6	3 00
2 50	38 54.1	123.0	39 45.7	122.4	40 36.8	121.7	41 27.9	121.0	42 18.6	120.3	2 50
40	40 06.8	125.7	40 58.9	125.1	41 50.7	124.4	42 42.3	123.7	43 33.7	123.0	40
30	41 17.1	128.5	42 09.9	127.9	43 02.2	127.2	43 54.5	126.5	44 46.5	125.8	30
20	42 24.8	131.4	43 18.1	130.7	44 11.1	130.1	45 04.0	129.4	45 56.6	128.7	20
10	43 19.4	134.3	44 23.4	133.7	45 17.1	133.1	46 10.5	132.4	47 03.9	131.8	10
2 00	44 30.8	137.4	45 25.4	136.8	46 19.8	136.2	47 14.0	135.5	48 08.1	134.9	2 00
1 50	45 28.8	140.5	46 24.0	140.0	47 19.1	139.4	48 14.0	138.8	49 08.7	138.1	1 50
40	46 23.0	143.7	47 18.8	143.2	48 14.5	142.7	49 10.1	142.1	50 05.5	141.5	40
30	47 13.1	147.1	48 09.5	146.6	49 06.0	146.1	50 02.2	145.5	50 58.4	144.9	30
20	47 58.7	150.4	48 55.9	150.0	49 53.0	149.5	50 50.0	149.0	51 46.8	148.4	20
10	48 39.9	153.9	49 37.8	153.5	50 35.4	153.1	51 32.9	152.6	52 30.5	152.2	10
1 00	49 16.2	157.5	50 14.5	157.1	51 12.8	156.7	52 10.9	156.3	53 09.0	155.9	1 00
0 50	49 47.4	161.1	50 46.2	160.8	51 45.0	160.5	52 43.7	160.1	53 42.2	159.8	0 50
40	50 13.3	164.8	51 12.5	164.6	52 11.7	164.3	53 10.8	164.0	54 10.0	163.7	40
30	50 33.5	168.6	51 33.2	168.4	52 32.7	168.2	53 32.8	167.9	54 31.7	167.7	30
20	50 48.2	172.4	51 48.0	172.2	52 47.8	172.1	53 47.6	171.9	54 47.3	171.8	20
10	50 57.0	176.2	51 57.0	176.1	52 57.0	176.0	53 56.9	175.9	54 56.8	175.9	10
0 00	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	0 01.8	54.5	0 53.5	54.0	1 45.1	53.5	2 36.8	52.9	3 28.4	52.4	8 00
7 50	1 14.5	56.5	2 05.7	56.0	2 56.7	55.5	3 47.9	54.9	4 39.2	54.4	7 50
40	2 28.8	58.5	3 19.6	57.9	4 10.4	57.4	5 01.2	56.9	5 51.8	56.3	40
30	3 44.7	60.4	4 35.1	59.9	5 25.3	59.3	6 15.6	58.8	7 05.8	58.3	30
20	5 02.2	62.4	5 52.1	61.9	6 42.0	61.3	7 31.9	60.8	8 21.7	60.2	20
10	6 21.0	64.4	7 10.5	63.8	7 59.9	63.2	8 49.3	62.7	9 38.8	62.1	10
7 00	7 41.1	66.4	8 30.3	65.8	9 19.4	65.2	10 08.4	64.6	10 57.4	64.0	7 00
6 50	9 02.5	68.3	9 51.3	67.7	10 40.0	67.1	11 28.7	66.5	12 17.3	65.9	6 50
40	10 25.0	70.2	11 13.5	69.6	12 01.9	69.0	12 50.2	68.4	13 38.4	67.8	40
30	11 48.4	72.1	12 36.6	71.5	13 24.6	70.9	14 12.6	70.3	15 00.5	69.7	30
20	13 12.7	74.1	14 00.6	73.5	14 48.4	72.8	15 36.1	72.2	16 23.7	71.5	20
10	14 37.9	76.0	15 25.6	75.4	16 13.0	74.7	17 00.4	74.1	17 47.8	73.4	10
6 00	16 03.8	77.9	16 51.2	77.3	17 38.5	76.7	18 25.7	76.0	19 12.7	75.3	6 00
5 50	17 30.2	79.8	18 17.6	79.2	19 04.6	78.6	19 51.5	77.9	20 38.3	77.2	5 50
40	18 57.4	81.8	19 44.4	81.2	20 31.3	80.5	21 18.1	79.8	22 04.6	79.1	40
30	20 24.7	83.7	21 11.8	83.1	21 58.5	82.4	22 45.0	81.8	23 31.5	81.1	30
20	21 52.6	85.7	22 39.4	85.1	23 26.1	84.4	24 12.5	83.7	24 58.8	83.0	20
10	23 20.6	87.7	24 07.4	87.0	24 54.0	86.3	25 40.2	85.6	26 26.4	84.9	10
5 00	24 48.8	89.7	25 35.5	89.0	26 22.0	88.3	27 08.3	87.6	27 54.4	86.9	5 00
4 50	26 16.9	91.7	27 03.7	91.0	27 50.1	90.3	28 36.4	89.6	29 22.5	88.9	4 50
40	27 45.0	93.8	28 31.8	93.1	29 18.3	92.4	30 04.7	91.7	30 50.7	91.0	40
30	29 12.8	95.9	29 59.7	95.2	30 46.2	94.5	31 32.6	93.7	32 18.7	93.0	30
20	30 40.3	98.0	31 27.3	97.3	32 14.0	96.6	33 00.5	95.8	33 46.7	95.1	20
10	32 07.4	100.2	32 54.6	99.5	33 41.4	98.7	34 28.1	98.0	35 14.4	97.2	10
4 00	33 33.9	102.4	34 21.3	101.7	35 08.3	100.9	35 55.2	100.2	36 41.6	99.4	4 00
3 50	34 59.5	104.7	35 47.2	103.9	36 34.5	103.2	37 21.5	102.4	38 08.4	101.6	3 50
40	36 24.4	107.0	37 12.3	106.2	38 00.0	105.5	38 47.3	104.7	39 34.3	103.9	40
30	37 48.2	109.4	38 36.5	108.6	39 24.4	107.8	40 12.1	107.0	40 59.5	106.2	30
20	39 10.7	111.8	39 59.4	111.0	40 47.7	110.2	41 35.8	109.5	42 23.5	108.7	20
10	40 31.8	114.3	41 21.0	113.5	42 09.7	112.7	42 58.3	111.9	43 46.6	111.1	10
3 00	41 51.4	116.9	42 41.0	116.1	43 30.3	115.3	44 19.4	114.5	45 08.0	113.7	3 00
2 50	43 09.1	119.5	43 59.3	118.8	44 49.1	118.0	45 38.7	117.2	46 27.8	116.4	2 50
40	44 24.7	122.2	45 15.5	121.5	46 05.9	120.7	46 56.1	119.9	47 45.9	119.1	40
30	45 38.1	125.1	46 29.5	124.4	47 20.6	123.6	48 11.2	122.8	49 01.8	122.0	30
20	46 48.9	128.0	47 41.0	127.3	48 32.8	126.5	49 24.3	125.8	50 15.4	125.0	20
10	47 56.9	131.1	48 49.7	130.4	49 42.1	129.6	50 34.2	128.9	51 26.2	128.1	10
2 00	49 01.8	134.2	49 55.3	133.5	50 48.5	132.8	51 41.5	132.1	52 34.1	131.3	2 00
1 50	50 03.1	137.5	50 57.5	136.8	51 51.4	136.1	52 45.1	135.4	53 38.7	134.7	1 50
40	51 00.7	140.9	51 55.7	140.2	52 50.5	139.5	53 45.1	138.8	54 39.4	138.2	40
30	51 54.2	144.4	32 50.2	143.8	53 45.5	143.1	54 41.1	142.5	55 36.1	141.8	30
20	52 43.5	147.9	53 40.0	147.4	54 36.4	146.8	55 32.5	146.2	56 28.5	145.6	20
10	53 27.8	151.7	54 25.2	151.2	55 22.1	150.7	56 19.0	150.1	57 15.7	149.5	10
1 00	54 07.0	155.5	55 04.9	155.0	56 02.7	154.6	57 00.4	154.1	57 58.0	153.5	1 00
0 50	54 40.9	159.4	55 39.5	159.0	56 37.6	158.6	57 36.0	158.2	58 34.4	157.7	0 50
40	55 09.0	163.4	56 08.0	163.1	57 06.9	162.7	58 05.8	162.4	59 04.6	162.0	40
30	55 31.0	167.5	56 30.7	167.2	57 29.9	167.0	58 29.2	166.7	59 28.7	166.4	30
20	55 47.1	171.6	56 46.7	171.5	57 46.5	171.3	58 46.3	171.1	59 46.0	170.9	20
10	55 56.8	175.8	56 56.7	175.7	57 56.7	175.6	58 56.5	175.5	59 56.4	175.4	10
0 00	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′		° ′	°	h. m.
6 00	0 00. 0	90. 0									6 00
5 50	1 28. 2	92. 0	0 39. 6	92. 6							5 50
40	2 56. 2	94. 0	2 07. 6	94. 6	1 18. 9	95. 2	0 30. 3	95. 8	0 18. 4	96. 4	40
30	4 24. 0	96. 0	3 35. 3	96. 6	2 46. 6	97. 2	1 57. 9	97. 8	1 09. 1	98. 4	30
20	5 51. 5	98. 1	5 02. 7	98. 7	4 13. 9	99. 3	3 25. 0	99. 9	2 36. 1	100. 5	20
10	7 18. 6	100. 1	6 29. 6	100. 7	5 40. 6	101. 3	4 51. 6	101. 9	4 02. 5	102. 5	10
5 00	8 45. 0	102. 2	7 55. 9	102. 8	7 06. 7	103. 4	6 17. 5	104. 0	5 28. 2	104. 6	5 00
4 50	10 10. 8	104. 3	9 21. 6	104. 9	8 32. 1	105. 5	7 42. 6	106. 0	6 53. 2	106. 6	4 50
40	11 35. 8	106. 4	10 46. 2	107. 0	9 56. 6	107. 6	9 06. 9	108. 1	8 17. 1	108. 7	40
30	12 59. 9	108. 5	12 10. 1	109. 1	11 20. 2	109. 7	10 30. 2	110. 2	9 40. 2	110. 8	30
20	14 23. 0	110. 7	13 32. 9	111. 2	12 42. 6	111. 8	11 52. 4	112. 3	11 02. 0	112. 9	20
10	15 44. 9	112. 8	14 54. 4	113. 4	14 03. 8	113. 9	13 13. 2	114. 5	12 22. 5	115. 0	10
4 00	17 05. 5	115. 0	16 14. 7	115. 6	15 23. 7	116. 1	14 32. 7	116. 7	13 41. 6	117. 2	4 00
3 50	18 24. 6	117. 2	17 33. 4	117. 8	16 42. 1	118. 3	15. 50. 8	118. 9	14 59. 2	119. 4	3 50
40	19 42. 1	119. 5	18 50. 5	120. 1	17 58. 8	120. 6	17 07. 1	121. 1	16 15. 2	121. 7	40
30	20 58. 0	121. 8	20 06. 0	122. 4	19 13. 8	122. 9	18 21. 7	123. 4	17 29. 3	123. 9	30
20	22 11. 9	124. 2	21 19. 5	124. 7	20 26. 9	125. 2	19 34. 2	125. 7	18 41. 5	126. 2	20
10	23 23. 8	126. 6	22 30. 9	127. 1	21 37. 8	127. 6	20 44. 8	128. 1	19 51. 5	128. 5	10
3 00	24 33. 6	129. 0	23 40. 2	129. 5	22 46. 6	130. 0	21 53. 0	130. 5	20 59. 3	130. 9	3 00
2 50	25 40. 8	131. 5	24 47. 0	131. 9	23 52. 9	132. 4	22 58. 8	132. 9	22 04. 7	133. 3	2 50
40	26 45. 6	134. 0	25 51. 2	134. 4	24 56. 7	134. 9	24 02. 2	135. 4	23 07. 5	135. 8	40
30	27 47. 7	136. 5	26 52. 8	136. 9	25 57. 8	137. 4	25 02. 8	137. 9	24 07. 6	138. 3	30
20	28 46. 9	139. 1	27 51. 5	139. 6	26 56. 0	140. 0	26 00. 4	140. 4	25 04. 8	140. 8	20
10	29 43. 0	141. 8	28 47. 2	142. 2	27 51. 2	142. 6	26 55. 1	143. 0	25 59. 0	143. 4	10
2 00	30 36. 0	144. 5	29 39. 6	144. 9	28 43. 0	145. 3	27 46. 5	145. 6	26 49. 8	146. 0	2 00
1 50	31 25. 4	147. 2	30 28. 6	147. 6	29 31. 7	148. 0	28 34. 6	148. 3	27 37. 4	148. 7	1 50
40	32 11. 4	150. 0	31 14. 0	150. 4	30 16. 6	150. 7	29 19. 1	151. 0	28 21. 5	151. 4	40
30	32 53. 4	152. 9	31 55. 6	153. 2	30 57. 8	153. 5	29 59. 8	153. 8	29 01. 8	154. 1	30
20	33 31. 6	155. 8	32 33. 4	156. 1	31 35. 1	156. 3	30 36. 8	156. 6	29 38. 4	156. 9	20
10	34 05. 7	158. 7	33 07. 2	159. 0	32 08. 4	159. 2	31 09. 8	159. 5	30 11. 1	159. 7	10
1 00	34 35. 6	161. 7	33 36. 6	161. 9	32 37. 6	162. 1	31 38. 6	162. 3	30 39. 5	162. 5	1 00
0 50	35 01. 2	164. 7	34 01. 8	164. 9	33 02. 7	165. 0	32 03. 2	165. 2	31 03. 9	165. 4	0 50
40	35 22. 2	167. 7	34 22. 7	167. 9	33 23. 1	168. 0	32 23. 6	168. 1	31 24. 0	168. 3	40
30	35 38. 7	170. 7	34 38. 9	170. 9	33 39. 2	171. 0	32 39. 5	171. 1	31 39. 7	171. 2	30
20	35 50. 5	173. 8	34 50. 6	173. 9	33 50. 7	174. 0	32 50. 8	174. 1	31 50. 9	174. 1	20
10	35 57. 6	176. 9	34 57. 7	176. 9	33 57. 7	177. 0	32 57. 7	177. 0	31 57. 8	177. 0	10
0 00	36 0. 0	180. 0	35 0. 0	180. 0	34 0. 0	180. 0	33 0. 0	180. 0	32 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 20.3	99.0									5 30
20	1 47.2	101.0	0 58.3	101.6	0 09.3	102.2					20
10	3 13.4	103.0	2 24.6	103.6	1 35.1	104.2	0 46.1	104.8			10
5 00	4 38.9	105.1	3 49.5	105.7	3 00.2	106.3	2 10.8	106.8	1 21.4	107.4	5 00
4 50	6 03.6	107.2	5 14.1	107.7	4 24.4	108.3	3 34.8	108.8	2 45.1	109.4	4 50
40	7 27.3	109.3	6 37.5	109.8	5 47.6	110.4	4 57.7	110.9	4 07.8	111.5	40
30	8 50.0	111.3	7 59.8	111.9	7 09.7	112.5	6 19.5	113.0	5 29.2	113.6	30
20	10 11.6	113.4	9 21.1	114.0	8 30.6	114.6	7 40.0	115.1	6 49.4	115.7	20
10	11 31.8	115.6	10 40.9	116.1	9 50.0	116.7	8 59.1	117.2	8 08.1	117.8	10
4 00	12 50.5	117.8	11 59.3	118.3	11 08.0	118.8	10 16.7	119.4	9 25.3	119.9	4 00
3 50	14 07.7	120.0	13 16.1	120.5	12 24.4	121.0	11 32.8	121.5	10 41.0	122.0	3 50
40	15 23.3	122.2	14 31.2	122.7	13 39.1	123.2	12 47.0	123.7	11 54.8	124.2	40
30	16 37.0	124.4	15 44.5	124.9	14 51.9	125.4	13 59.4	125.9	13 06.8	126.4	30
20	17 48.7	126.7	16 55.8	127.2	16 02.8	127.7	15 09.8	128.2	14 16.7	128.7	20
10	18 58.2	129.0	18 04.7	129.5	17 11.4	130.0	16 17.9	130.5	15 24.4	131.0	10
3 00	20 05.6	131.4	19 11.7	131.8	18 17.9	132.3	17 23.9	132.8	16 29.8	133.3	3 00
2 50	21 10.5	133.8	20 16.1	134.2	19 21.6	134.7	18 27.3	135.1	17 32.7	135.6	2 50
40	22 12.8	136.2	21 18.0	136.7	20 23.1	137.1	19 28.2	137.5	18 33.2	138.0	40
30	23 12.4	138.7	22 17.1	139.1	21 21.6	139.5	20 26.3	139.9	19 30.8	140.4	30
20	24 09.1	141.2	23 13.3	141.6	22 17.4	142.0	21 21.5	142.4	20 25.6	142.8	20
10	25 02.8	143.8	24 06.4	144.1	23 10.1	144.5	22 13.8	144.9	21 17.4	145.3	10
2 00	25 53.2	146.4	24 56.5	146.7	23 59.7	147.1	23 02.9	147.4	22 06.0	147.8	2 00
1 50	26 40.3	149.0	25 43.2	149.3	24 45.8	149.7	23 48.6	150.0	22 51.4	150.3	1 50
40	27 23.9	151.7	26 26.3	152.0	25 28.6	152.3	24 30.9	152.6	23 33.2	152.9	40
30	28 03.8	154.4	27 05.8	154.7	26 07.8	155.0	25 09.6	155.2	24 11.6	155.5	30
20	28 40.0	157.2	27 41.6	157.4	26 43.2	157.7	25 44.7	157.9	24 46.2	158.2	20
10	29 12.3	159.9	28 13.5	160.1	27 14.8	160.4	26 16.0	160.6	25 17.2	160.8	10
1 00	29 40.5	162.7	28 41.4	162.9	27 42.3	163.1	26 43.2	163.3	25 44.1	163.5	1 00
0 50	30 04.6	165.6	19 05.2	165.7	28 05.8	165.9	27 06.6	166.0	26 07.2	166.2	0 50
40	30 24.4	168.5	29 24.9	168.6	28 25.3	168.7	27 25.7	168.8	26 26.1	169.0	40
30	30 40.0	171.3	29 40.2	171.4	28 40.4	171.5	27 40.7	171.6	26 40.8	171.7	30
20	30 51.0	174.2	29 51.2	174.3	28 51.3	174.3	27 51.4	174.4	26 51.5	174.4	20
10	30 57.8	177.1	29 57.8	177.1	28 57.8	177.1	27 57.8	177.2	26 57.8	177.2	10
0 00	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 32.1	108.0									5 00
4 50	1 55.5	110.0	1 05.8	110.5	0 16.1	111.1					4 50
40	3 17.8	112.0	2 27.8	112.6	1 37.8	113.1	0 47.8	113.7	0 02.3	114.3	40
30	4 38.9	114.1	3 48.5	114.6	2 58.2	115.2	2 07.9	115.7	1 17.5	116.3	30
20	5 58.7	116.2	5 08.0	116.7	4 17.3	117.3	3 26.6	117.8	2 35.8	118.3	20
10	7 17.1	118.3	6 25.9	118.8	5 34.9	119.3	4 43.9	119.9	3 02.7	120.4	10
4 00	8 33.9	120.4	7 42.5	120.9	6 51.0	121.4	5 59.5	122.0	5 07.9	122.5	4 00
3 50	9 49.1	122.5	8 57.2	123.0	8 05.4	123.5	7 13.4	124.1	6 21.3	124.6	3 50
40	11 02.6	124.7	10 10.3	125.2	9 17.9	125.7	8 25.5	126.2	7 33.1	126.7	40
30	12 14.1	126.9	11 21.3	127.4	10 28.5	127.9	9 35.7	128.4	8 42.8	128.8	30
20	13 23.6	129.2	12 30.4	129.6	11 37.1	130.1	10 43.8	130.6	9 50.4	131.0	20
10	14 30.8	131.5	13 37.1	131.9	12 43.3	132.3	11 49.6	132.8	10 55.7	133.2	10
3 00	15 35.7	133.7	14 41.5	134.2	13 47.3	134.6	12 53.1	135.1	11 58.8	135.5	3 00
2 50	16 38.2	136.0	15 43.6	136.5	14 48.9	136.9	13 54.1	137.3	12 59.3	137.7	2 50
40	17 38.1	138.4	16 43.0	138.8	15 47.8	139.2	14 52.6	139.6	13 57.3	140.0	40
30	18 35.3	140.8	17 39.6	141.2	16 44.0	141.5	15 48.3	141.9	14 52.6	142.3	30
20	19 29.6	143.2	18 33.5	143.6	17 37.4	143.9	16 41.3	144.3	15 45.1	144.7	20
10	20 20.9	145.6	19 24.4	146.0	18 27.8	146.3	17 31.1	146.7	16 34.6	147.1	10
2 00	21 09.1	148.1	20 12.1	148.5	19 15.1	148.8	18 18.1	149.1	17 21.0	149.5	2 00
1 50	21 54.0	150.6	20 56.5	151.0	19 59.1	151.3	19 01.7	151.6	18 04.1	151.9	1 50
40	22 35.4	153.2	21 37.6	153.5	20 39.8	153.8	19 41.9	154.1	18 44.1	154.3	40
30	23 13.4	155.8	22 15.2	156.1	21 17.0	156.3	20 18.8	156.6	19 20.4	156.8	30
20	23 47.7	158.4	22 49.2	158.7	21 50.6	158.9	20 52.0	159.1	19 53.4	159.3	20
10	24 18.3	161.0	23 19.4	161.3	22 20.5	161.5	21 21.7	161.6	20 22.7	161.8	10
1 00	24 44.9	163.7	23 45.8	163.9	22 46.6	164.1	21 47.4	164.2	20 48.2	164.4	1 00
0 50	25 07.8	166.4	24 08.3	166.5	23 08.9	166.7	22 09.5	166.8	21 10.0	167.0	0 50
40	25 26.5	169.1	24 26.8	169.2	23 27.2	169.3	22 27.6	169.4	21 27.9	169.6	40
30	25 41.1	171.8	24 41.3	171.9	23 41.5	171.9	22 51.8	172.1	21 51.9	172.2	30
20	25 51.6	174.5	24 51.7	174.6	23 51.8	174.6	22 51.9	174.7	21 52.0	174.8	20
10	25 58.0	177.2	24 57.9	177.3	23 58.0	177.3	22 58.0	177.4	21 58.0	177.4	10
0 00	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	0 27.0	116.8									4 30
20	1 45.0	118.9	0 54.2	119.4	0 03.5	119.9					20
10	3 01.4	120.9	2 10.3	121.4	1 19.1	121.9	0 27.9	122.5			10
4 00	4 16.3	123.0	3 24.7	123.5	2 33.1	124.0	1 41.5	124.5	0 49.8	125.0	4 00
3 50	5 19.3	125.1	4 37.3	125.6	3 45.1	126.1	2 53.1	126.6	2 01.2	127.1	3 50
40	6 40.6	127.2	5 48.1	127.7	4 55.6	128.2	4 03.0	128.7	3 10.5	129.1	40
30	7 49.8	129.3	6 56.8	129.8	6 03.8	130.3	5 10.9	130.8	4 17.8	131.2	30
20	8 57.0	131.5	8 03.5	132.0	7 10.1	132.4	6 16.6	132.9	5 23.1	133.3	20
10	10 01.9	133.7	9 07.9	134.1	8 14.0	134.5	7 20.1	135.0	6 26.2	135.4	10
3 00	11 04.5	135.9	10 10.1	136.3	9 15.7	136.7	8 21.3	137.2	7 26.8	137.6	3 00
2 50	12 04.5	138.1	11 09.7	138.5	10 04.8	138.9	9 19.9	139.4	8 25.0	139.8	2 50
40	13 02.0	140.4	12 06.7	140.8	11 11.4	141.2	10 16.0	141.6	9 20.6	142.0	40
30	13 56.9	142.7	13 01.1	143.1	12 05.2	143.5	11 09.4	143.8	10 13.6	144.2	30
20	14 48.9	145.0	13 52.6	145.4	12 56.3	145.8	12 00.1	146.1	11 03.7	146.5	20
10	15 37.8	147.4	14 41.2	147.7	13 44.5	148.1	12 47.7	148.4	11 50.9	148.7	10
2 00	16 23.8	149.8	15 26.7	150.1	14 29.6	150.5	13 32.4	150.7	12 35.2	151.0	2 00
1 50	17 06.7	152.2	16 09.1	152.5	15 11.6	152.8	14 13.9	153.0	13 16.3	153.3	1 50
40	17 46.1	154.6	16 48.2	154.9	15 50.2	155.2	14 52.2	155.4	13 54.2	155.7	40
30	18 22.2	157.1	17 23.8	157.3	16 25.7	157.6	15 27.2	157.8	14 28.9	158.0	30
20	18 54.8	159.6	17 56.1	159.8	16 57.5	160.0	15 58.8	160.2	15 00.2	160.4	20
10	19 23.8	162.1	18 24.8	162.3	17 25.8	162.4	16 26.9	162.6	15 27.9	162.8	10
1 00	19 49.0	164.6	18 49.8	164.8	17 50.5	164.9	16 51.3	165.1	15 52.1	165.3	1 00
0 50	20 10.6	167.1	19 11.1	167.3	18 11.7	167.4	17 12.1	167.5	16 12.7	167.7	0 50
40	20 28.3	169.7	19 28.6	169.8	18 29.0	169.9	17 29.3	170.0	16 29.6	170.1	40
30	20 42.1	172.2	19 42.4	172.3	18 42.5	172.4	17 42.8	172.5	16 42.9	172.6	30
20	20 52.0	174.8	19 52.1	174.9	18 52.2	175.0	17 52.3	175.0	16 52.4	175.1	20
10	20 58.0	177.4	19 58.0	177.4	18 58.0	177.5	17 58.1	177.5	16 58.1	177.5	10
0 00	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 00	0 01.8	125.6									4 00
3 50	1 09.0	127.6	0 16.9	128.1							3 50
40	2 17.9	129.6	1 25.3	130.1	0 32.8	130.6					40
30	3 24.8	131.7	2 31.8	132.1	1 38.7	132.6	0 45.7	133.1			30
20	4 29.6	133.8	3 36.1	134.2	2 42.5	134.7	1 48.9	135.1	0 55.3	135.6	20
10	5 32.1	135.9	4 38.1	136.3	3 44.0	136.8	2 50.0	137.2	1 56.0	137.7	10
3 00	6 32.3	138.0	5 37.8	138.4	4 43.2	138.9	3 48.7	139.3	2 54.1	139.7	3 00
2 50	7 30.1	140.2	6 35.1	140.6	5 40.0	141.0	4 45.1	141.4	3 49.9	141.8	2 50
40	8 25.2	142.4	7 29.7	142.8	6 34.2	143.1	5 38.7	143.5	4 43.1	143.9	40
30	9 17.6	144.6	8 21.7	145.0	7 25.7	145.3	6 29.7	145.7	5 33.8	146.0	30
20	10 07.4	146.8	9 11.0	147.2	8 14.6	147.5	7 18.2	147.9	6 21.7	148.2	20
10	10 54.2	149.0	9 57.3	149.4	9 00.4	149.7	8 03.6	150.1	7 06.7	150.4	10
2 00	11 38.0	151.3	10 40.8	151.6	9 43.5	151.9	8 46.2	152.2	7 48.9	152.5	2 00
1 50	12 18.7	153.6	11 21.1	153.9	10 23.4	154.2	9 25.7	154.5	8 28.1	154.8	1 50
40	12 56.2	156.0	11 58.2	156.2	11 00.1	156.5	10 02.1	156.7	9 04.0	157.0	40
30	13 30.5	158.3	12 32.2	158.5	11 33.7	158.8	10 35.5	159.0	9 36.9	159.2	30
20	14 01.5	160.7	13 02.8	160.9	12 04.0	161.1	11 05.3	161.3	10 06.5	161.5	20
10	14 28.9	163.0	13 30.0	163.2	12 30.9	163.4	11 31.9	163.6	10 32.9	163.8	10
1 00	14 52.9	165.4	13 53.6	165.6	12 54.4	165.8	11 55.1	165.9	10 55.8	166.1	1 00
0 50	15 13.2	167.8	14 13.8	168.0	13 14.2	168.1	12 14.8	168.2	11 15.4	168.4	0 50
40	15 30.0	170.2	14 30.3	170.4	13 30.7	170.5	12 31.0	170.6	11 31.3	170.7	40
30	15 43.1	172.6	14 43.4	172.7	13 43.5	172.8	12 43.7	172.9	11 43.9	173.0	30
20	15 52.5	175.1	14 52.6	175.2	13 52.7	175.2	12 52.7	175.3	11 52.8	175.3	20
10	15 58.1	177.5	14 58.2	177.6	13 58.2	177.6	12 58.2	177.6	11 58.2	177.6	10
0 00	16 0.0	180.0	15 0.0	180.0	14 0.0	180.0	13 0.0	180.0	12 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 25.1	83.6	6 20
10					0 12.3	86.8	1 01.6	86.2	1 50.6	85.6	10
6 00	0 00.0	90.0	0 49.2	89.4	1 38.3	88.9	2 27.4	88.3	3 16.5	87.7	6 00
5 50	1 26.1	92.0	2 15.2	91.4	3 04.2	90.9	3 53.4	90.3	4 42.6	89.7	5 50
40	2 51.9	94.1	3 41.1	93.5	4 30.3	93.0	5 19.4	92.4	6 08.6	91.8	40
30	4 17.6	96.2	5 06.8	95.6	5 56.2	95.0	6 45.4	94.4	7 34.5	93.8	30
20	5 43.0	98.2	6 32.4	97.6	7 21.7	97.1	8 11.0	96.5	9 00.2	95.9	20
10	7 07.9	100.3	7 57.4	99.7	8 46.9	99.1	9 36.2	98.6	10 25.7	98.0	10
5 00	8 32.2	102.4	9 21.9	101.8	10 11.5	101.2	11 01.1	100.7	11 50.6	100.1	5 00
4 50	9 55.9	104.5	10 45.8	103.9	11 35.6	103.3	12 25.3	102.8	13 15.0	102.2	4 50
40	11 18.8	106.6	12 08.9	106.0	12 58.9	105.4	13 48.8	104.9	14 38.7	104.3	40
30	12 40.8	108.7	13 31.1	108.2	14 21.3	107.6	15 11.6	107.1	16 01.7	106.5	30
20	14 01.7	110.9	14 52.3	110.4	15 42.8	109.8	16 33.3	109.2	17 23.7	108.7	20
10	15 21.5	113.1	16 12.4	112.6	17 03.2	112.0	17 54.0	111.4	18 44.6	110.9	10
4 00	16 39.9	115.3	17 31.2	114.8	18 22.4	114.2	19 13.5	113.7	20 04.4	113.1	4 00
3 50	17 57.0	117.5	18 48.6	117.0	19 40.1	116.5	20 31.6	115.9	21 22.9	115.4	3 50
40	19 12.4	119.8	20 04.4	119.3	20 56.4	118.8	21 48.2	118.2	22 39.9	117.7	40
30	20 26.2	122.2	21 18.6	121.6	22 10.9	121.1	23 03.1	120.6	23 55.2	120.0	30
20	21 38.1	124.5	22 30.9	124.0	23 23.7	123.5	24 16.3	123.0	25 08.8	122.4	20
10	22 47.9	126.9	23 41.2	126.4	24 34.4	125.9	25 27.4	125.4	26 20.4	124.8	10
3 00	23 55.6	129.3	24 49.4	128.8	25 43.0	128.3	26 36.5	127.8	27 29.9	127.3	3 00
2 50	25 01.0	131.8	25 55.2	131.3	26 49.3	130.8	27 43.3	130.3	28 37.2	129.8	2 50
40	26 03.9	134.3	26 58.5	133.9	27 53.1	133.4	28 47.6	132.9	29 42.0	132.4	40
30	27 04.1	136.9	27 59.2	136.4	28 54.3	136.0	29 49.3	135.5	30 44.2	135.0	30
20	28 01.5	139.5	28 57.1	139.1	29 52.6	138.6	30 48.1	138.2	31 43.5	137.7	20
10	28 55.8	142.1	29 52.0	141.7	30 48.1	141.3	31 44.0	140.9	32 39.8	140.4	10
2 00	29 47.0	144.8	30 43.6	144.4	31 40.2	144.1	32 36.6	143.7	33 33.0	143.2	2 00
1 50	30 34.9	147.5	31 31.9	147.2	32 29.0	146.9	33 25.9	146.5	34 22.8	146.1	1 50
40	31 19.3	150.3	32 16.8	150.0	33 14.2	149.7	34 11.6	149.3	35 09.0	149.0	40
30	31 59.9	153.2	32 57.8	152.9	33 55.8	152.6	34 53.7	152.2	35 51.5	151.9	30
20	32 36.9	156.0	33 35.2	155.8	34 33.5	155.5	35 31.7	155.2	36 29.9	154.9	20
10	33 09.7	158.9	34 08.5	158.7	35 07.2	158.5	36 05.8	158.2	37 04.4	157.9	10
1 00	33 38.6	161.9	34 37.7	161.7	35 36.6	161.5	36 35.6	161.2	37 34.6	161.0	1 00
0 50	34 03.3	164.9	35 02.5	164.7	36 01.8	164.5	37 01.2	164.3	38 00.3	164.1	0 50
40	34 23.6	167.9	35 23.1	167.7	36 22.7	167.6	37 22.2	167.4	38 21.7	167.2	40
30	34 39.4	170.9	35 39.2	170.8	36 39.0	170.7	37 38.7	170.5	38 38.4	170.4	30
20	34 50.9	173.9	35 50.8	173.8	36 50.7	173.8	37 50.5	173.7	38 50.4	173.6	20
10	34 57.7	176.9	35 57.7	176.9	36 57.7	176.9	37 57.7	176.8	38 57.6	176.8	10
0 00	35 0.0	180.0	36 0.0	180.0	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 19.0	74.6	6 50
40					0 03.4	77.7	0 52.8	77.3	1 42.3	76.7	40
30			0 38.4	80.4	1 27.8	79.8	2 17.1	79.3	3 06.4	78.7	30
20	1 14.3	83.0	2 03.5	82.5	2 52.7	81.9	3 41.9	81.3	4 31.1	80.7	20
10	2 39.8	85.0	3 29.0	84.5	4 18.1	83.9	5 07.2	83.3	5 55.7	82.8	10
6 00	4 05.6	87.1	4 54.8	86.6	5 43.8	86.0	6 32.8	85.4	7 21.8	84.8	6 00
5 50	5 31.6	89.1	6 20.8	88.6	7 09.7	88.0	7 58.7	87.4	8 47.6	86.8	5 50
40	6 57.7	91.2	7 46.7	90.7	8 35.7	90.1	9 24.7	89.5	10 13.5	88.9	40
30	8 23.6	93.2	9 12.7	92.7	10 01.7	92.1	10 50.6	91.5	11 39.6	90.9	30
20	9 49.4	95.3	10 38.6	94.8	11 27.7	94.2	12 16.7	93.6	13 05.6	93.0	20
10	11 14.9	97.4	12 04.2	96.8	12 53.3	96.3	13 42.4	95.7	14 31.4	95.1	10
5 00	12 40.0	99.5	13 29.3	98.9	14 18.6	98.4	15 07.8	97.8	15 56.9	97.2	5 00
4 50	14 04.6	101.6	14 54.1	101.0	15 43.6	100.5	16 32.8	99.9	17 22.1	99.3	4 50
40	15 28.5	103.7	16 18.3	103.1	17 07.9	102.6	17 57.4	102.0	18 46.7	101.4	40
30	16 51.6	105.9	17 41.6	105.3	18 31.4	104.7	19 21.1	104.1	20 10.8	103.5	30
20	18 14.0	108.1	19 04.1	107.5	19 54.2	106.9	20 44.2	106.3	21 34.0	105.7	20
10	19 35.2	110.3	20 25.6	109.7	21 16.0	109.1	22 06.2	108.5	22 56.2	107.9	10
4 00	20 55.3	112.5	21 46.0	112.0	22 36.7	111.4	23 27.2	110.8	24 17.6	110.2	4 00
3 50	22 14.1	114.8	23 05.2	114.3	23 56.2	113.7	24 47.0	113.1	25 37.6	112.5	3 50
40	23 31.5	117.1	24 22.9	116.6	25 14.3	116.0	26 05.5	115.4	26 56.5	114.8	40
30	24 47.2	119.5	25 39.0	118.9	26 30.8	118.4	27 22.4	117.8	28 13.8	117.2	30
20	26 01.2	121.9	26 53.5	121.3	27 45.7	120.8	28 37.7	120.2	29 29.5	119.6	20
10	27 13.2	124.3	28 06.0	123.8	28 58.6	123.2	29 51.0	122.7	30 43.3	122.1	10
3 00	28 23.3	126.8	29 16.5	126.3	30 09.5	125.7	31 02.5	125.2	31 55.2	124.6	3 00
2 50	29 30.9	129.3	30 24.7	128.8	31 18.2	128.3	32 11.6	127.8	33 04.8	127.2	2 50
40	30 36.3	131.9	31 30.4	131.4	32 24.5	130.9	33 18.4	130.4	34 12.2	129.9	40
30	31 38.9	134.6	32 33.6	134.1	33 28.2	133.6	34 22.6	133.1	35 16.9	132.6	30
20	32 38.8	137.3	33 34.0	136.8	34 29.1	136.3	35 24.0	135.8	36 18.8	135.3	20
10	33 35.6	140.0	34 31.3	139.6	35 27.0	139.1	36 22.4	138.6	37 17.8	138.2	10
2 00	34 29.3	142.8	35 25.5	142.4	36 21.7	142.0	37 17.7	141.5	38 13.6	141.1	2 00
1 50	35 19.5	145.7	36 16.2	145.3	37 12.9	144.9	38 09.4	144.4	39 05.8	144.0	1 50
40	36 06.3	148.6	37 03.5	148.2	38 00.6	147.8	38 57.7	147.4	39 54.6	147.0	40
30	36 49.1	151.6	37 46.8	151.2	38 44.5	150.9	39 42.1	150.5	40 39.5	150.1	30
20	37 28.3	154.6	38 26.2	154.3	39 24.4	153.9	40 22.4	153.6	41 20.4	153.3	20
10	38 03.0	157.6	39 01.5	157.4	40 00.1	157.1	40 58.5	156.8	41 56.8	156.5	10
1 00	38 33.6	160.7	39 32.5	160.5	40 31.4	160.3	41 30.2	160.0	42 28.9	159.7	1 00
0 50	38 59.7	163.9	39 58.9	163.7	40 58.1	163.5	41 57.2	163.3	42 56.5	163.0	0 50
40	39 21.2	167.1	40 20.7	166.9	41 20.2	166.7	42 19.7	166.6	43 19.1	166.4	40
30	39 38.1	170.3	40 37.8	170.1	41 37.5	170.0	42 37.3	169.9	43 37.0	169.8	30
20	39 50.3	173.5	40 50.2	173.4	41 50.0	173.3	42 49.9	173.2	43 49.8	173.1	20
10	39 57.5	176.7	40 57.6	176.7	41 57.5	176.6	42 57.5	176.6	43 57.4	176.6	10
0 00	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20									0 26.9	65.8	7 20
10					0 05.5	68.9	0 55.7	68.4	1 45.9	67.8	10
7 00			0 36.4	71.5	1 26.3	70.9	2 16.3	70.4	3 06.1	69.8	7 00
6 50	1 08.7	74.1	1 58.4	73.5	2 48.2	72.9	3 37.8	72.4	4 27.4	71.8	6 50
40	2 31.8	76.1	3 21.3	75.6	4 10.8	75.0	5 00.2	74.4	5 49.6	73.8	40
30	3 56.0	78.1	4 45.1	77.6	5 34.3	77.0	6 23.6	76.4	7 12.7	75.8	30
20	5 20.2	80.2	6 09.3	79.6	6 58.4	79.0	7 47.4	78.4	8 36.5	77.9	20
10	6 45.2	82.2	7 34.2	81.6	8 23.2	81.0	9 12.1	80.4	10 00.9	79.9	10
6 00	8 10.7	84.2	8 59.5	83.6	9 48.3	83.1	10 37.1	82.5	11 25.8	81.9	6 00
5 50	9 36.4	86.2	10 25.2	85.7	11 14.0	85.1	12 02.7	84.5	12 51.1	83.9	5 50
40	11 02.4	88.3	11 51.1	87.7	12 39.8	87.1	13 28.3	86.5	14 16.8	85.9	40
30	12 28.4	90.3	13 17.1	89.7	14 05.8	89.1	14 54.2	88.5	15 42.8	87.9	30
20	13 54.4	92.4	14 43.1	91.8	15 31.7	91.2	16 20.3	90.6	17 08.8	90.0	20
10	15 20.2	94.4	16 09.1	93.8	16 57.8	93.2	17 46.2	92.6	18 34.8	92.0	10
5 00	16 45.9	96.5	17 34.8	95.9	18 23.5	95.3	19 12.2	94.7	20 00.7	94.1	5 00
4 50	18 11.1	98.6	19 00.2	98.0	19 49.0	97.4	20 37.9	96.8	21 26.4	96.2	4 50
40	19 36.0	100.8	20 25.2	100.2	21 14.2	99.6	22 03.0	99.0	22 51.8	98.3	40
30	21 00.1	102.9	21 49.5	102.3	22 38.8	101.7	23 27.8	101.1	24 16.6	100.4	30
20	22 23.7	105.1	23 13.2	104.5	24 02.6	103.9	24 51.8	103.3	25 40.9	102.6	20
10	23 46.2	107.3	24 36.0	106.7	25 25.7	106.1	26 15.1	105.5	27 04.1	104.8	10
4 00	25 07.8	109.6	25 57.9	109.0	26 47.8	108.4	27 37.6	107.8	28 27.2	107.1	4 00
3 50	26 28.2	111.9	27 18.7	111.3	28 09.0	110.7	28 59.0	110.1	29 48.9	109.4	3 50
40	27 47.4	114.2	28 38.2	113.6	29 28.7	113.0	30 19.1	112.4	31 09.4	111.8	40
30	29 05.2	116.6	29 56.2	116.0	30 47.2	115.4	31 38.1	114.8	32 28.7	114.2	30
20	30 21.2	119.0	31 12.8	118.4	32 04.2	117.8	32 55.4	117.2	33 46.4	116.6	20
10	31 35.6	121.5	32 27.6	120.9	33 19.3	120.3	34 11.0	119.7	35 02.4	119.1	10
3 00	32 47.8	124.1	33 40.3	123.5	34 32.6	122.9	35 24.8	122.3	36 16.7	121.7	3 00
2 50	33 57.9	126.7	34 50.9	126.1	35 43.7	125.5	36 36.4	124.9	37 28.8	124.3	2 50
40	35 05.8	129.3	35 59.3	128.8	36 52.6	128.2	37 45.8	127.6	38 38.8	127.0	40
30	36 11.0	132.0	37 05.0	131.5	37 59.0	131.0	38 52.7	130.4	39 46.1	129.8	30
20	37 13.6	134.8	38 08.1	134.3	39 02.5	133.8	39 56.8	133.2	40 51.0	132.6	20
10	38 13.0	137.7	39 08.2	137.2	40 03.2	136.7	40 58.0	136.1	41 52.7	135.6	10
2 00	39 09.4	140.6	40 05.0	140.1	41 00.6	139.6	41 56.1	139.1	42 51.4	138.6	2 00
1 50	40 02.2	143.6	40 58.5	143.1	41 54.6	142.6	42 50.7*	142.3	43 46.5	141.7	1 50
40	40 51.5	146.6	41 48.3	146.2	42 45.0	145.8	43 41.6	145.3	44 38.0	144.8	40
30	41 36.8	149.7	42 34.3	149.3	43 31.5	148.9	44 28.5	148.5	45 25.5	148.1	30
20	42 18.2	152.9	43 16.0	152.6	44 13.7	152.2	45 11.4	151.8	46 08.9	151.4	20
10	42 55.1	156.2	43 53.4	155.8	44 51.7	155.5	45 49.8	155.2	46 47.7	154.8	10
1 00	43 27.7	159.5	44 26.4	159.2	45 25.0	158.9	46 23.6	158.6	47 22.2	158.2	1 00
0 50	43 55.5	162.8	44 54.5	162.6	45 53.7	162.3	46 52.7	162.0	47 51.6	161.8	0 50
40	44 18.5	166.2	45 17.9	166.0	46 17.3	165.8	47 16.6	165.6	48 16.0	165.4	40
30	44 36.6	169.6	45 36.2	169.5	46 35.9	169.3	47 25.3	169.1	48 35.1	169.0	30
20	44 49.6	173.0	45 49.4	173.0	46 49.2	172.9	47 49.1	172.7	48 48.9	172.6	20
10	44 57.4	176.5	45 57.3	176.5	46 57.3	176.4	47 57.2	176.4	48 57.1	176.3	10
0 00	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 50								57.5	0 49.1	57.0	7 50
40					0 26.4	60.1	1 17.7	59.6	2 08.9	59.1	40
30			0 50.9	62.7	1 41.8	62.1	2 32.7	61.6	3 23.4	61.1	30
20	1 17.5	65.2	2 08.0	64.7	2 58.5	64.1	3 49.0	63.6	4 39.5	63.1	20
10	2 36.1	67.3	3 26.4	66.7	4 16.6	66.2	5 06.7	65.6	5 56.8	65.1	10
7 00	3 56.1	69.3	4 45.9	68.7	5 35.8	68.2	6 25.6	67.6	7 15.4	67.0	7 00
6 50	5 17.1	71.3	6 06.7	70.7	6 56.2	70.1	7 45.8	69.5	8 35.2	69.0	6 50
40	6 39.0	72.3	7 28.4	72.7	8 17.7	72.1	9 06.9	71.5	9 56.1	70.9	40
30	8 01.8	75.3	8 50.9	74.7	9 40.0	74.1	10 28.9	73.5	11 17.8	72.9	30
20	9 25.4	77.3	10 14.3	76.7	11 03.1	76.1	11 51.8	75.5	12 40.5	74.9	20
10	10 49.7	79.3	11 38.3	78.7	12 27.0	78.1	13 15.5	77.5	14 03.9	76.9	10
6 00	12 14.4	81.3	13 03.0	80.7	13 51.4	80.1	14 39.8	79.5	15 28.0	78.8	6 00
5 50	13 39.7	83.3	14 28.1	82.7	15 16.4	82.1	16 04.6	81.4	16. 52.7	80.8	5 50
40	15 05.3	85.3	15 53.6	84.7	16 41.8	84.1	17 29.9	83.4	18 17.9	82.8	40
30	16 31.1	87.3	17 19.3	86.7	18 07.5	86.1	18 55.5	85.4	19 43.4	84.8	30
20	17 57.1	89.3	18 45.3	88.7	19 33.4	88.1	20 21.4	87.4	21 09.2	86.8	20
10	19 23.1	91.4	20 11.3	90.7	20 59.4	90.1	21 47.4	89.4	22 35.2	88.8	10
5 00	20 49.1	93.5	21 37.4	92.8	22 25.5	92.2	23 13.5	91.5	24 01.3	90.8	5 00
4 50	22 14.9	95.6	23 03.1	94.9	23 51.4	94.3	24 39.4	93.6	25 27.2	92.9	4 50
40	23 43.3	97.7	24 28.7	97.0	25 17.0	96.4	26 05.1	95.7	26 53.0	95.0	40
30	25 05.4	99.8	25 53.9	99.1	26 42.4	98.5	27 30.5	97.8	28 18.6	97.1	30
20	26 29.9	102.0	27 18.6	101.3	28 07.2	100.7	28 55.5	100.0	29 43.7	99.3	20
10	27 53.7	104.2	28 42.7	103.5	29 31.4	102.9	30 20.0	102.2	31 08.2	101.5	10
4 00	29 16.6	106.5	30 05.8	105.8	30 54.8	105.1	31 43.7	104.5	32 32.3	103.8	4 00
3 50	30 38.7	108.8	31 28.1	108.1	32 17.5	107.4	33 06.5	106.8	33 55.5	106.1	3 50
40	31 59.5	111.1	32 49.4	110.4	33 39.0	109.8	34 28.4	109.1	35 17.6	108.4	40
30	33 19.1	113.5	34 09.3	112.8	34 59.3	112.2	35 49.1	111.5	36 38.7	110.8	30
20	34 37.2	116.0	35 27.8	115.3	36 18.2	114.6	37 08.4	113.9	37 58.4	113.2	20
10	35 53.8	118.5	36 44.8	117.8	37 35.8	117.2	38 26.3	116.5	39 16.7	115.8	10
3 00	37 08.5	121.0	38 00.1	120.4	38 51.4	119.7	39 42.5	119.1	40 33.3	118.4	3 00
2 50	38 21.1	123.7	39 13.1	123.1	40 05.1	122.4	40 56.7	121.8	41 48.0	121.1	2 50
40	39 31.5	126.4	40 24.2	125.8	41 16.5	125.1	42 08.7	124.5	43 00.7	123.8	40
30	40 39.5	129.2	41 32.7	128.6	42 25.8	127.9	43 18.5	127.3	44 11.0	126.7	30
20	41 44.9	132.0	42 38.7	131.5	43 32.2	130.8	44 25.6	130.2	45 18.8	129.6	20
10	42 47.1	135.0	43 41.6	134.5	44 35.8	133.8	45 29.8	133.2	46 23.5	132.6	10
2 00	43 46.5	138.0	44 41.5	137.5	45 36.3	136.9	46 30.9	136.3	47 25.4	135.7	2 00
1 50	44 42.2	141.1	45 37.8	140.6	46 33.4	140.0	47 28.6	139.5	48 23.7	138.9	1 50
40	45 34.4	144.3	46 30.6	143.8	47 26.7	143.3	48 22.6	142.8	49 18.4	142.2	40
30	46 22.4	147.6	47 19.3	147.1	48 16.0	146.7	49 12.6	146.2	50 09.1	145.6	30
20	47 06.5	151.0	48 03.9	150.5	49 01.2	150.1	49 58.5	149.6	50 55.5	149.1	20
10	47 56.1	154.4	48 43.9	154.0	49 41.9	153.6	50 39.5	153.2	51 37.2	152.8	10
1 00	48 20.7	157.9	49 19.2	157.6	50 17.6	157.2	51 15.9	156.8	52 14.2	156.4	1 00
0 50	48 50.5	161.5	49 49.3	161.2	50 48.4	160.9	51 47.1	160.6	52 45.9	160.2	0 50
40	49 15.3	165.1	50 14.6	164.9	51 13.9	164.6	52 13.1	164.4	53 12.3	164.1	40
30	49 34.8	168.8	50 34.2	168.6	51 34.0	168.4	52 33.4	168.2	53 33.0	168.0	30
20	49 48.8	172.5	50 48.6	172.4	51 48.4	172.3	52 48.2	172.1	53 48.0	172.0	20
10	49 57.2	176.2	50 57.1	176.2	51 57.1	176.1	52 57.1	176.0	53 57.0	176.0	10
0 00	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star it setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

110165°—19——36

47°46.1

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	0 36.7	54.5	1 28.8	54.0	2 20.8	53.5	3 12.9	53.0	4 04.9	52.5	8 00
7 50	1 47.7	56.5	2 39.3	56.0	3 30.9	55.5	4 22.4	55.0	5 14.0	54.5	7 50
40	3 00.2	58.5	3 51.4	58.0	4 42.6	57.5	5 33.8	57.0	6 25.0	56.4	40
30	4 14.3	60.5	5 05.2	60.0	5 56.0	59.4	6 46.7	58.9	7 37.4	58.4	30
20	5 29.9	62.5	6 20.4	62.0	7 10.8	61.4	8 01.2	60.9	8 51.5	60.3	20
10	6 46.9	64.5	7 37.0	63.9	8 27.1	63.3	9 17.0	62.8	10 06.8	62.2	10
7 00	8 05.1	66.5	8 54.9	65.9	9 44.5	65.3	10 34.1	64.8	11 23.6	64.2	7 00
6 50	9 24.7	68.5	10 14.0	67.9	11 03.3	67.2	11 52.5	66.7	12 41.7	66.1	6 50
40	10 45.2	70.4	11 34.3	69.8	12 23.3	69.2	13 12.2	68.6	14 01.0	68.0	40
30	12 06.7	72.3	12 55.5	71.7	13 44.2	71.1	14 32.7	70.5	15 21.2	69.9	30
20	13 29.1	74.3	14 17.6	73.7	15 06.0	73.1	15 54.3	72.5	16 42.5	71.8	20
10	14 52.3	76.3	15 40.6	75.6	16 28.7	75.0	17 16.8	74.4	18 04.7	73.8	10
6 00	16 16.2	78.2	17 04.3	77.6	17 52.2	77.0	18 40.1	76.3	19 27.7	75.7	6 00
5 50	17 40.7	80.2	18 28.6	79.6	19 16.3	79.0	20 03.9	78.3	20 51.3	77.6	5 50
40	19 05.8	82.1	19 53.5	81.5	20 41.0	80.9	21 28.5	80.2	22 15.8	79.6	40
30	20 31.1	84.1	21 18.7	83.5	22 06.2	82.8	22 53.4	82.2	23 40.6	81.5	30
20	21 56.9	86.1	22 44.4	85.5	23 31.7	84.8	24 18.9	84.1	25 05.9	83.4	20
10	23 22.8	88.1	24 10.2	87.5	24 57.6	86.8	25 44.6	86.1	26 31.6	85.4	10
5 00	24 48.9	90.2	25 36.3	89.5	26 23.5	88.8	27 10.6	88.1	27 57.4	87.4	5 00
4 50	26 14.8	92.2	27 02.2	91.6	27 49.5	90.9	28 36.5	90.2	29 23.3	89.5	4 50
40	27 40.7	94.3	28 28.3	93.7	29 15.5	93.0	30 02.6	92.2	30 49.4	91.5	40
30	29 06.4	96.4	29 54.0	95.8	30 41.3	95.1	31 28.4	94.3	32 15.3	93.6	30
20	30 31.7	98.6	31 19.4	97.9	32 06.9	97.2	32 54.1	96.4	33 41.1	95.7	20
10	31 56.4	100.8	32 44.3	100.1	33 32.0	99.4	34 19.4	98.6	35 06.5	97.9	10
4 00	33 20.7	103.1	34 08.8	102.4	34 56.7	101.6	35 44.3	100.9	36 31.5	100.1	4 00
3 50	34 44.1	105.4	35 32.4	104.7	36 20.5	103.9	37 08.3	103.1	37 55.9	102.4	3 50
40	36 06.6	107.7	36 55.3	107.0	37 43.7	106.2	38 31.8	105.4	39 19.6	104.7	40
30	37 27.9	110.1	38 16.9	109.4	39 05.7	108.6	39 54.2	107.8	40 42.2	107.1	30
20	38 48.1	112.5	39 37.5	111.8	40 26.6	111.0	41 15.5	110.3	42 04.0	109.5	20
10	40 06.9	115.1	40 56.6	114.3	41 46.2	113.6	42 35.5	112.8	43 24.5	112.0	10
3 00	41 23.9	117.7	42 14.2	116.9	43 04.3	116.2	43 54.1	115.4	44 43.5	114.6	3 00
2 50	42 39.2	120.4	43 30.0	119.6	44 20.6	118.9	45 10.7	118.1	46 00.7	117.3	2 50
40	43 52.4	123.1	44 43.8	122.4	45 34.9	121.6	46 25.8	120.9	47 16.3	120.1	40
30	45 03.2	126.0	45 55.2	125.3	46 47.1	124.5	47 38.5	123.8	48 29.6	123.0	30
20	46 11.6	128.9	47 04.3	128.2	47 56.7	127.4	48 48.9	126.7	49 40.7	125.9	20
10	47 17.1	131.9	48 10.5	131.2	49 03.6	130.5	49 56.4	129.8	50 48.9	129.0	10
2 00	48 19.6	135.0	49 13.6	134.4	50 07.4	133.7	51 01.0	133.0	51 54.2	132.2	2 00
1 50	49 18.7	138.3	50 13.3	137.7	51 08.0	137.0	52 02.1	136.3	52 56.0	135.6	1 50
40	50 14.0	141.6	51 09.4	141.0	52 04.7	140.4	52 59.7	139.7	53 54.5	139.1	40
30	51 05.3	145.1	52 01.5	144.5	52 57.5	144.0	53 53.1	143.3	54 48.7	142.7	30
20	51 52.5	148.6	52 49.3	148.1	53 46.0	147.6	54 42.5	147.0	55 38.8	146.4	20
10	52 34.9	152.3	53 32.4	151.8	54 29.6	151.4	55 26.7	150.8	56 23.9	150.2	10
1 00	53 12.4	156.0	54 10.5	155.6	55 08.4	155.2	56 06.4	154.7	57 04.2	154.2	1 00
0 50	53 44.6	159.9	54 43.2	159.5	55 41.9	159.2	56 40.2	158.7	57 38.6	158.3	0 50
40	54 11.5	163.8	55 10.6	163.5	56 09.6	163.2	57 08.6	162.9	58 07.6	162.5	40
30	54 32.5	167.8	55 32.0	167.6	56 31.6	167.3	57 30.9	167.1	58 30.2	166.8	30
20	54 47.8	171.8	55 47.5	171.7	56 47.2	171.5	57 47.0	171.4	58 46.7	171.2	20
10	54 56.9	175.9	55 56.7	175.8	56 56.9	175.7	57 56.7	175.7	58 56.6	175.6	10
0 00	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	59 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 26.1	92.0	0 36.9	92.6							5 50
40	2 51.9	94.1	2 02.7	94.7	1 13.4	95.3	0 24.2	95.8			40
30	4 17.6	96.2	3 28.3	96.7	2 39.0	97.3	1 49.7	97.8	1 00.3	98.4	30
20	5 43.0	98.2	4 53.6	98.8	4 04.1	99.4	3 14.7	99.9	2 25.2	100.5	20
10	7 07.9	100.3	6 18.4	100.9	5 28.8	101.4	4 39.1	101.9	3 49.6	102.5	10
5 00	8 32.2	102.4	7 42.5	103.0	6 52.8	103.5	6 03.0	104.1	5 13.1	104.6	5 00
4 50	9 55.9	104.5	9 06.0	105.1	8 16.0	105.6	7 26.0	106.2	6 35.9	106.7	4 50
40	11 18.8	106.6	10 28.6	107.2	9 38.4	107.7	8 48.2	108.3	7 57.8	108.8	40
30	12 40.8	108.7	11 50.4	109.3	10 59.8	109.8	10 09.3	110.4	9 18.8	110.9	30
20	14 01.7	110.9	13 11.0	111.5	12 20.2	112.0	11 29.4	112.6	10 38.5	113.1	20
10	15 21.5	113.1	14 30.5	113.7	13 39.4	114.2	12 48.2	114.7	11 57.0	115.3	10
4 00	16 39.9	115.3	15 48.7	115.9	14 57.2	116.4	14 05.7	116.9	13 14.1	117.5	4 00
3 50	17 57.0	117.5	17 05.2	118.1	16 13.5	118.6	15 21.7	119.1	14 29.8	119.7	3 50
40	19 12.4	119.8	18 20.4	120.4	17 28.2	120.9	16 36.0	121.4	15 43.6	121.9	40
30	20 26.2	122.2	19 33.8	122.7	18 41.1	123.2	17 48.4	123.7	16 55.8	124.2	30
20	21 38.1	124.5	20 45.2	125.0	19 52.2	125.5	18 59.0	126.0	18 05.9	126.5	20
10	22 47.9	126.9	21 54.7	127.4	21 01.2	127.9	20 07.6	128.4	19 14.0	128.8	10
3 00	23 55.6	129.3	23 01.9	129.8	22 07.9	130.3	21 13.9	130.8	20 19.8	131.2	3 00
2 50	25 01.0	131.8	24 06.8	132.3	23 12.4	132.7	22 17.9	133.2	21 23.4	133.6	2 50
40	26 03.9	134.3	25 09.1	134.8	24 14.2	135.2	23 19.4	135.7	22 24.4	136.1	40
30	27 04.1	136.9	26 08.8	137.3	25 13.5	137.7	24 18.2	138.2	23 22.7	138.6	30
20	28 01.5	139.5	27 05.7	139.9	26 10.0	140.3	25 14.1	140.7	24 18.2	141.1	20
10	28 55.8	142.1	27 59.8	142.5	27 03.4	142.9	26 07.1	143.3	25 10.6	143.7	10
2 00	29 47.0	144.8	28 50.4	145.2	27 53.7	145.6	26 56.9	145.9	26 00.0	146.3	2 00
1 50	30 34.9	147.5	29 37.8	147.9	28 40.7	148.3	27 43.4	148.6	26 46.1	148.9	1 50
40	31 19.3	150.3	30 21.7	150.7	29 24.1	151.0	28 26.5	151.3	27 28.8	151.6	40
30	31 59.9	153.2	31 02.0	153.5	30 04.0	153.8	29 05.9	154.1	28 07.9	154.3	30
20	32 36.9	156.0	31 38.5	156.3	30 40.1	156.6	29 41.7	156.9	28 43.2	157.1	20
10	33 09.7	158.9	32 11.1	159.2	31 12.4	159.4	30 13.6	159.7	29 14.8	159.9	10
1 00	33 38.6	161.9	32 39.6	162.1	31 40.5	162.3	30 41.4	162.5	29 42.3	162.7	1 00
0 50	34 03.3	164.9	33 03.9	165.0	32 04.6	165.2	31 05.2	165.4	30 05.8	165.5	0 50
40	34 23.6	167.9	33 24.0	168.0	32 24.4	168.1	31 24.9	168.3	30 25.3	168.4	40
30	34 39.4	170.9	33 39.8	170.0	32 39.9	171.0	31 40.2	171.2	30 40.4	171.3	30
20	34 50.9	173.9	33 51.0	174.0	32 51.5	174.0	31 51.1	174.1	30 51.2	174.2	20
10	34 57.7	176.9	33 57.8	177.0	32 57.8	177.0	31 57.8	177.0	30 57.8	177.1	10
0 00	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 10.9	99.0									5 30
20	1 35.7	101.1	0 46.2	101.6	0 03.4	102.3					20
10	2 59.8	103.1	2 10.1	103.7	1 20.3	104.2	0 30.7	104.8			10
5 00	4 23.2	105.2	3 33.3	105.8	2 43.4	106.3	1 53.5	106.9	1 03.5	107.4	5 00
4 50	5 45.9	107.3	4 55.7	107.8	4 05.6	108.4	3 15.4	108.9	2 25.2	109.5	4 50
40	7 07.5	109.4	6 17.1	109.9	5 26.7	110.5	4 36.2	111.0	3 45.8	111.6	40
30	8 28.1	111.5	7 37.4	112.0	6 46.7	112.6	5 56.0	113.1	5 05.3	113.7	30
20	9 47.6	113.6	8 56.6	114.2	8 05.6	114.7	7 14.5	115.2	6 23.4	115.8	20
10	11 05.7	115.8	10 14.4	116.3	9 23.0	116.8	8 31.6	117.3	7 40.2	117.9	10
4 00	12 22.5	118.0	11 30.8	118.5	10 39.1	119.0	9 47.3	119.5	8 55.4	120.0	4 00
3 50	13 37.7	120.2	12 45.6	120.7	11 53.5	121.2	11 01.3	121.7	10 09.1	122.2	3 50
40	14 51.3	122.4	13 58.7	122.9	13 06.2	123.4	12 13.6	123.9	11 21.0	124.4	40
30	16 02.9	124.7	15 10.0	125.1	14 17.1	125.6	13 24.1	126.1	12 31.1	126.6	30
20	17 12.7	127.0	16 19.4	127.4	15 26.0	127.9	14 32.6	128.4	13 39.1	128.9	20
10	18 20.3	129.3	17 26.6	129.7	16 32.8	130.2	15 38.9	130.7	14 45.0	131.2	10
3 00	19 25.8	131.7	18 31.5	132.1	17 37.3	132.6	16 43.0	133.0	15 48.6	133.5	3 00
2 50	20 28.8	134.1	19 34.1	134.5	18 39.4	135.0	17 44.7	135.4	16 49.8	135.8	2 50
40	21 29.4	136.5	20 34.2	137.0	19 39.0	137.4	18 43.8	137.8	17 48.5	138.2	40
30	22 27.2	139.0	21 31.4	139.4	20 36.0	139.8	19 40.3	140.2	18 44.6	140.6	30
20	23 22.2	141.5	22 26.2	141.9	21 30.1	142.3	20 33.9	142.7	19 37.7	143.0	20
10	24 14.2	144.0	23 17.7	144.4	22 21.3	144.8	21 24.6	145.2	20 28.0	145.5	10
2 00	25 03.2	146.6	24 06.3	147.0	23 09.3	147.3	22 12.3	147.7	21 15.2	148.0	2 00
1 50	25 48.8	149.2	24 51.4	149.6	23 54.1	149.9	22 56.6	150.2	21 59.9	150.5	1 50
40	26 31.0	151.9	25 33.3	152.2	24 35.5	152.5	23 37.6	152.8	22 39.7	153.1	40
30	27 09.7	154.6	26 11.5	154.9	25 13.4	155.2	24 15.2	155.4	23 16.9	155.7	30
20	27 44.0	157.4	26 46.2	157.6	25 47.7	157.8	24 49.1	158.1	23 50.5	158.3	20
10	28 15.9	160.1	27 17.0	160.3	26 18.2	160.5	25 19.2	160.8	24 20.5	161.0	10
1 00	28 43.2	162.9	27 44.0	163.1	26 44.9	163.3	25 45.7	163.5	24 46.5	163.7	1 00
0 50	29 06.5	165.7	28 07.1	165.9	27 07.7	166.0	26 08.2	166.2	25 08.9	166.4	0 50
40	29 25.7	168.5	28 26.1	168.7	27 26.5	168.8	26 26.8	168.9	25 27.2	169.1	40
30	29 40.7	171.4	28 40.8	171.5	27 41.1	171.6	26 41.3	171.6	25 41.5	171.8	30
20	29 51.3	174.3	28 51.5	174.3	27 51.6	174.4	26 51.7	174.4	25 51.8	174.5	20
10	29 57.8	177.1	28 57.8	177.1	27 57.9	177.2	26 57.9	177.2	25 58.0	177.3	10
0 00	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 00	0 13.6	108.0									5 00
4 50	1 34.9	110.0	0 44.8	110.6							4 50
40	2 55.3	112.1	2 04.8	112.6	1 14.2	113.2	0 23.7	113.7			40
30	4 14.4	114.2	3 23.5	114.7	2 32.7	115.2	1 41.8	115.7	0 50.9	116.3	30
20	5 32.3	116.3	4 41.0	116.8	3 49.8	117.3	2 58.6	117.8	2 07.4	118.4	20
10	6 48.6	118.4	5 57.1	118.9	5 05.5	119.4	4 13.9	119.9	3 22.0	120.5	10
4 00	8 03.5	120.5	7 11.6	121.0	6 19.6	121.5	5 27.7	122.0	4 35.7	122.6	4 00
3 50	9 16.8	122.7	8 24.5	123.2	7 32.2	123.7	6 39.8	124.2	5 47.3	124.7	3 50
40	10 28.3	124.9	9 35.6	125.4	8 42.8	125.9	7 50.0	126.3	6 57.2	126.8	40
30	11 38.0	127.1	10 44.8	127.6	9 51.6	128.1	8 58.3	128.5	8 05.1	129.0	30
20	12 45.6	129.3	11 52.0	129.8	10 58.3	130.3	10 04.7	130.7	9 11.0	131.2	20
10	13 51.1	131.6	12 57.0	132.0	12 02.8	132.5	11 08.8	132.9	10 14.6	133.4	10
3 00	14 54.2	133.9	13 59.7	134.3	13 05.1	134.8	12 10.6	135.2	11 16.0	135.6	3 00
2 50	15 54.9	136.2	14 59.9	136.6	14 05.0	137.1	13 10.0	137.5	12 14.9	137.9	2 50
40	16 53.2	138.6	15 57.8	139.0	15 02.3	139.4	14 06.9	139.8	13 11.3	140.2	40
30	17 48.7	141.0	16 52.9	141.4	15 57.1	141.7	15 02.1	142.1	14 05.1	142.5	30
20	18 41.5	143.4	17 45.2	143.8	16 48.8	144.1	15 52.5	144.5	14 56.1	144.8	20
10	19 31.3	145.8	18 34.6	146.2	17 37.9	146.5	16 41.0	146.9	15 44.1	147.2	10
2 00	20 18.1	148.2	19 20.9	148.7	18 23.7	149.0	17 26.5	149.3	16 29.3	149.6	2 00
1 50	21 01.6	150.8	20 04.0	151.1	19 06.4	151.4	18 08.9	151.7	17 11.1	152.0	1 50
40	21 41.8	153.4	20 43.9	153.7	19 45.9	153.9	18 47.9	154.2	17 49.9	154.5	40
30	22 18.6	156.0	21 20.4	156.2	20 22.1	156.4	19 23.7	156.7	18 25.2	157.0	30
20	22 51.9	158.6	21 53.3	158.8	20 54.6	159.0	19 55.9	159.2	18 57.2	159.5	20
10	23 21.5	161.2	22 22.5	161.4	21 23.7	161.6	20 24.7	161.8	19 25.4	162.0	10
1 00	23 47.3	163.8	22 48.1	164.0	21 48.9	164.2	20 49.6	164.4	19 50.4	164.5	1 00
0 50	24 09.4	166.5	23 09.9	166.6	22 10.5	166.8	21 11.0	166.9	20 11.5	167.0	0 50
40	24 27.6	169.2	23 27.9	169.3	22 28.3	169.4	21 28.6	169.5	20 29.0	169.6	40
30	24 41.8	171.9	23 41.9	172.0	22 42.1	172.0	21 42.2	172.1	20 42.4	172.2	30
20	24 51.9	174.6	23 52.0	174.7	22 52.1	174.7	21 52.2	174.8	20 52.3	174.8	20
10	24 57.9	177.3	23 58.0	177.3	22 58.0	177.3	21 58.0	177.4	20 58.0	177.4	10
0 00	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 30	0 00.1	116.8									4 30
20	1 16.1	118.9	0 24.8	119.4							20
10	2 30.7	121.0	1 39.0	121.5	0 47.4	122.0					10
4 00	3 43.7	123.1	2 51.6	123.6	1 59.6	124.0	1 07.5	124.5	0 15.4	125.0	4 00
3 50	4 54.9	125.1	4 02.4	125.7	3 09.9	126.1	2 17.4	126.6	1 25.0	127.1	3 50
40	6 04.3	127.3	5 11.4	127.8	4 18.5	128.2	3 25.6	128.7	2 32.7	129.2	40
30	7 11.8	129.4	6 18.4	129.9	5 25.1	130.3	4 31.8	130.8	3 38.3	131.3	30
20	8 17.2	131.6	7 23.4	132.1	6 29.6	132.5	5 35.8	133.0	4 41.9	133.4	20
10	9 20.4	133.8	8 26.1	134.2	7 31.9	134.6	6 37.7	135.1	5 43.3	135.5	10
3 00	10 21.4	136.0	9 26.7	136.4	8 31.9	136.8	7 37.2	137.3	6 42.5	137.7	3 00
2 50	11 19.9	138.3	10 24.7	138.6	9 29.6	139.0	8 34.3	139.5	7 39.2	139.9	2 50
40	12 15.8	140.6	11 20.2	140.9	10 24.6	141.3	9 28.9	141.7	8 33.3	142.1	40
30	13 09.1	142.9	12 13.1	143.2	11 17.1	143.6	10 21.0	143.9	9 24.8	144.3	30
20	13 59.7	145.2	13 03.2	145.5	12 06.7	145.9	11 10.2	146.2	10 13.7	146.6	20
10	14 47.2	147.2	13 50.4	147.8	12 53.6	148.2	11 56.6	148.5	10 59.7	148.8	10
2 00	15 32.0	149.9	14 34.7	150.2	13 37.4	150.5	12 40.0	150.8	11 42.7	151.1	2 00
1 50	16 13.5	152.3	15 15.8	152.6	14 18.1	152.9	13 20.4	153.1	12 22.7	153.4	1 50
40	16 51.9	154.7	15 53.8	155.0	14 55.7	155.3	13 57.6	155.5	12 59.5	155.8	40
30	17 26.9	157.2	16 28.5	157.4	15 30.1	157.7	14 31.7	157.9	13 33.2	158.1	30
20	17 58.6	159.7	16 59.8	159.9	16 01.1	160.1	15 02.4	160.3	14 03.6	160.5	20
10	18 26.7	162.2	17 27.6	162.4	16 28.7	162.6	15 29.6	162.7	14 30.6	162.9	10
1 00	18 51.2	164.7	17 51.9	164.9	16 52.6	165.1	15 53.4	165.2	14 54.1	165.3	1 00
0 50	19 12.1	167.2	18 12.5	167.4	17 13.1	167.5	16 13.7	167.6	15 14.1	167.7	0 50
40	19 29.3	169.8	18 29.6	169.9	17 30.0	170.0	16 30.3	170.1	15 30.6	170.2	40
30	19 42.7	172.3	18 42.8	172.4	17 43.1	172.5	16 43.2	172.5	15 43.4	172.6	30
20	19 52.3	174.9	18 52.4	174.9	17 52.5	175.0	16 52.6	175.0	15 52.7	175.1	20
10	19 58.1	177.4	18 58.1	177.4	17 58.1	177.5	16 58.1	177.5	15 58.2	177.5	10
0 00	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 50	0 32.4	127.6									3 50
40	1 39.7	129.6	0 46.8	130.1							40
30	2 44.8	131.7	1 51.5	132.2	0 58.1	132.6	0 04.7	133.1			30
20	3 48.1	133.9	2 54.2	134.3	2 00.3	134.7	1 06.4	135.1	0 12.5	135.6	20
10	4 49.1	136.0	3 54.6	136.4	3 00.2	136.8	2 06.0	137.2	1 11.6	137.7	10
3 00	5 47.7	138.1	4 52.9	138.5	3 58.1	138.9	3 03.3	139.3	2 08.4	139.7	3 00
2 50	6 44.0	140.3	5 48.6	140.6	4 53.3	141.0	3 58.1	141.4	3 02.7	141.8	2 50
40	7 37.6	142.5	6 41.9	142.8	5 46.2	143.2	4 50.5	143.6	3 54.7	143.9	40
30	8 28.7	144.7	7 32.6	145.0	6 36.4	145.4	5 40.2	145.8	4 44.0	146.1	30
20	9 17.1	146.9	8 20.6	147.2	7 24.0	147.6	6 27.4	147.9	5 30.7	148.2	20
10	10 02.6	149.1	9 05.7	149.4	8 08.7	149.8	7 11.7	150.1	6 14.6	150.4	10
2 00	10 45.3	151.4	9 48.0	151.7	8 50.5	152.0	7 53.1	152.3	6 55.7	152.6	2 00
1 50	11 24.9	153.7	10 27.2	154.0	9 29.4	154.3	8 31.6	154.5	7 33.7	154.8	1 50
40	12 01.4	156.0	11 03.3	156.3	10 05.1	156.6	9 07.0	156.8	8 08.8	157.1	40
30	12 34.7	158.3	11 36.3	158.6	10 37.8	158.9	9 39.3	159.1	8 40.8	159.3	30
20	13 04.9	160.7	12 06.1	160.9	11 07.3	161.2	10 08.5	161.4	9 09.7	161.6	20
10	13 31.6	163.1	12 32.5	163.3	11 33.4	163.5	10 34.1	163.7	9 35.2	163.8	10
1 00	13 54.9	165.5	12 55.5	165.7	11 56.3	165.8	10 56.9	166.0	9 57.6	166.1	1 00
0 50	14 14.6	167.9	13 15.1	168.0	12 15.6	168.1	11 16.1	168.3	10 16.6	168.4	0 50
40	14 30.9	170.3	13 31.2	170.4	12 31.6	170.5	11 31.9	170.6	10 32.2	170.7	40
30	14 43.6	172.7	13 43.7	172.8	12 44.0	172.8	11 44.2	172.9	10 44.3	173.0	30
20	14 52.8	175.1	13 52.9	175.2	12 52.9	175.2	11 53.0	175.3	10 53.0	175.3	20
10	14 58.2	177.5	13 58.2	177.6	12 58.2	177.6	11 58.2	177.6	10 58.2	177.7	10
0 00	15 0.0	180.0	14 0.0	180.0	13 0.0	180.0	12 0.0	180.0	11 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 31.7	83.7	6 20
10					0 15.6	86.8	1 05.4	86.3	1 55.2	85.7	10
6 00	0 00.0	90.0	0 49.7	89.4	1 39.5	88.9	2 29.2	88.3	3 18.9	87.8	6 00
5 50	1 23.9	92.1	2 13.7	91.5	3 03.3	90.9	3 53.1	90.4	4 42.8	89.8	5 50
40	2 47.5	94.2	3 37.3	93.6	4 27.1	93.0	5 16.9	92.5	6 06.6	91.9	40
30	4 11.2	96.2	5 01.1	95.7	5 50.8	95.1	6 40.7	94.6	7 30.4	94.0	30
20	5 34.3	98.3	6 24.3	97.8	7 14.2	97.2	8 04.1	96.6	8 53.9	96.1	20
10	6 57.1	100.4	7 47.2	99.9	8 37.2	99.3	9 27.2	98.7	10 17.2	98.2	10
5 00	8 19.3	102.5	9 09.5	102.0	9 59.7	101.4	10 49.9	100.9	11 39.9	100.3	5 00
4 50	9 40.8	104.6	10 31.2	104.1	11 21.6	103.5	12 12.1	103.0	13 02.2	102.4	4 50
40	11 01.6	106.8	11 52.2	106.3	12 42.8	105.7	13 33.3	105.1	14 23.7	104.6	40
30	12 21.4	108.9	13 12.3	108.4	14 03.1	107.9	14 53.9	107.3	15 44.5	106.8	30
20	13 40.1	111.1	14 31.3	110.6	15 22.4	110.1	16 13.4	109.5	17 04.3	109.0	20
10	14 57.8	113.3	15 49.2	112.8	16 40.6	112.3	17 31.8	111.7	18 23.1	111.2	10
4 00	16 14.2	115.6	17 06.0	115.1	17 57.6	114.5	18 49.2	114.0	19 40.7	113.4	4 00
3 50	17 29.1	117.8	18 21.3	117.3	19 13.2	116.8	20 05.2	116.3	20 56.9	115.7	3 50
40	18 42.5	120.1	19 35.0	119.6	20 27.3	119.1	21 19.6	118.6	22 11.8	118.1	40
30	19 54.1	122.4	20 47.0	121.9	21 39.8	121.4	22 32.4	120.9	23 25.0	120.4	30
20	21 04.0	124.8	21 57.2	124.3	22 50.4	123.8	23 43.5	123.3	24 36.4	122.8	20
10	22 11.8	127.2	23 05.5	126.7	23 59.1	126.2	24 52.6	125.7	25 45.9	125.2	10
3 00	23 17.5	129.7	24 11.6	129.2	25 05.6	128.7	25 59.6	128.2	26 53.4	127.7	3 00
2 50	24 20.9	132.2	25 15.5	131.7	26 09.9	131.2	27 04.2	130.7	27 58.6	130.2	2 50
40	25 21.8	134.7	26 16.8	134.2	27 11.7	133.8	28 06.6	133.3	29 01.3	132.8	40
30	26 20.1	137.2	27 15.7	136.8	28 11.0	136.4	29 06.3	135.9	30 01.6	135.4	30
20	27 15.7	139.8	28 11.6	139.4	29 07.5	139.0	30 03.2	138.6	30 58.9	138.1	20
10	28 08.3	142.4	29 04.9	142.1	30 01.0	141.7	30 57.2	141.3	31 53.4	140.8	10
2 00	28 57.9	145.1	29 54.7	144.8	30 51.5	144.4	31 48.2	144.0	32 44.8	143.6	2 00
1 50	29 44.1	147.9	30 41.4	147.5	31 38.7	147.2	32 35.8	146.8	33 32.9	146.4	1 50
40	30 27.0	150.7	31 24.7	150.3	32 22.3	150.0	33 19.9	149.7	34 17.4	149.3	40
30	31 06.3	153.5	32 04.5	153.2	33 02.5	152.9	34 00.4	152.6	34 58.4	152.2	30
20	31 42.0	156.3	32 40.4	156.0	33 38.8	155.8	34 37.2	155.5	35 35.5	155.2	20
10	32 13.7	159.2	33 12.6	158.9	34 11.3	158.7	35 10.1	158.5	36 08.8	158.2	10
1 00	32 41.6	162.1	33 40.7	161.9	34 39.7	161.7	35 38.8	161.5	36 37.8	161.2	1 00
0 50	33 05.3	165.0	34 04.7	164.9	35 04.1	164.7	36 03.4	164.5	37 02.7	164.3	0 50
40	33 24.9	168.0	34 24.5	167.9	35 24.1	167.7	36 23.6	167.6	37 23.2	167.4	40
30	33 40.2	171.0	34 40.0	170.9	35 39.8	170.7	36 39.5	170.6	37 39.2	170.5	30
20	33 51.2	174.0	34 51.1	173.9	35 51.0	173.8	36 50.8	173.7	37 50.7	173.7	20
10	33 57.8	177.0	34 57.8	176.9	35 57.7	176.9	36 57.7	176.9	37 57.7	176.8	10
0 00	34 0.0	180.0	35 0.0	180.0	36 0.0	180.0	37 0.0	180.0	38 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East: and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 34.9	74.7	6 50
40					0 16.0	77.8	1 06.0	77.3	1 56.1	76.7	40
30			0 48.3	80.4	1 38.3	79.9	2 28.3	79.3	3 18.1	78.8	30
20	1 21.5	83.1	2 11.3	82.5	3 01.1	82.0	3 50.9	81.4	4 40.7	80.8	20
10	2 44.9	85.1	3 34.7	84.5	4 24.4	84.0	5 14.1	83.4	6 03.7	82.9	10
6 00	4 08.6	87.2	4 58.3	86.6	5 47.9	86.1	6 37.5	85.5	7 27.1	84.9	6 00
5 50	5 32.5	89.3	6 22.1	88.7	7 11.7	88.1	8 01.3	87.5	8 50.8	87.0	5 50
40	6 56.3	91.4	7 46.0	90.8	8 35.6	90.2	9 25.2	89.6	10 14.7	89.1	40
30	8 20.1	93.4	9 09.8	92.9	9 59.4	92.3	10 49.0	91.7	11 38.5	91.1	30
20	9 43.7	95.5	10 33.5	95.0	11 23.2	94.4	12 12.8	93.8	13 02.3	93.2	20
10	11 07.1	97.6	11 56.9	97.1	12 46.6	96.5	13 36.3	95.9	14 25.9	95.3	10
5 00	12 29.9	99.7	13 19.9	99.2	14 09.8	98.6	14 59.6	98.0	15 49.3	97.5	5 00
4 50	13 52.4	101.8	14 42.4	101.3	15 32.5	100.7	16 22.5	100.1	17 12.3	99.6	4 50
40	15 14.1	104.0	16 04.4	103.5	16 54.6	102.9	17 44.7	102.3	18 34.7	101.7	40
30	16 35.1	106.2	17 25.6	105.6	18 16.0	105.1	19 06.3	104.5	19 56.5	103.9	30
20	17 55.2	108.4	18 45.9	107.8	19 36.6	107.3	20 27.1	106.7	21 17.5	106.1	20
10	19 14.2	110.6	20 05.2	110.0	20 56.1	109.5	21 46.9	108.9	22 37.6	108.4	10
4 00	20 32.1	112.9	21 23.4	112.3	22 14.6	111.8	23 05.7	111.2	23 56.7	110.6	4 00
3 50	21 48.7	115.2	22 40.3	114.6	23 31.9	114.1	24 23.3	113.5	25 14.5	112.9	3 50
40	23 03.9	117.5	23 55.9	117.0	24 47.8	116.4	25 39.5	115.9	26 31.1	115.3	40
30	24 17.5	119.9	25 09.8	119.3	26 02.1	118.8	26 54.2	118.3	27 46.2	117.7	30
20	25 29.3	122.3	26 22.1	121.8	27 14.8	121.2	28 07.3	120.7	28 59.6	120.1	20
10	26 39.2	124.7	27 32.4	124.2	28 25.5	123.7	29 18.5	123.2	30 11.3	122.6	10
3 00	27 47.2	127.2	28 40.8	126.7	29 34.3	126.2	30 27.7	125.7	31 20.9	125.1	3 00
2 50	28 52.8	129.8	29 46.8	129.3	30 40.8	128.8	31 34.7	128.3	32 28.4	127.7	2 50
40	29 56.0	132.4	30 50.5	131.9	31 45.0	131.4	32 39.3	130.9	33 33.5	130.4	40
30	30 56.7	135.0	31 51.7	134.5	32 46.6	134.1	33 41.5	133.6	34 36.1	133.1	30
20	31 54.5	137.7	32 50.0	137.2	33 45.5	136.8	34 40.8	136.3	35 36.0	135.8	20
10	32 49.5	140.4	33 45.4	140.0	34 41.5	139.6	35 37.2	139.1	36 32.9	138.7	10
2 00	33 41.4	143.2	34 37.8	142.8	35 34.2	142.4	36 30.5	142.0	37 26.7	141.5	2 00
1 50	34 29.9	146.1	35 26.8	145.7	36 23.7	145.3	37 20.5	144.9	38 17.2	144.5	1 50
40	35 14.9	149.0	36 12.3	148.6	37 09.7	148.2	38 07.0	147.9	39 04.2	147.5	40
30	35 56.3	151.9	36 54.2	151.6	37 52.0	151.2	38 49.6	150.9	39 47.3	150.5	30
20	36 33.8	154.9	37 32.1	154.6	38 30.4	154.3	39 28.6	154.0	40 26.7	153.7	20
10	37 07.4	158.0	38 06.0	157.7	39 04.7	157.4	40 03.2	157.1	41 01.7	156.8	10
1 00	37 36.8	161.0	38 35.8	160.8	39 34.8	160.5	40 33.7	160.3	41 32.5	160.0	1 00
0 50	38 01.9	164.1	39 01.2	163.9	40 00.5	163.7	40 59.8	163.5	41 58.9	163.3	0 50
40	38 22.7	167.3	39 22.3	167.1	40 21.8	166.9	41 21.3	166.8	42 20.8	166.6	40
30	38 38.9	170.4	39 38.7	170.3	40 38.5	170.2	41 38.2	170.1	42 37.8	169.9	30
20	38 50.6	173.6	39 50.5	173.5	40 50.4	173.4	41 50.3	173.4	42 50.2	173.3	20
10	38 57.6	176.8	39 57.5	176.7	40 57.5	176.7	41 57.5	176.7	42 57.5	176.6	10
0 00	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 20							0 00.5	66.3	0 51.5	65.8	7 20
10					0 27.1	68.9	1 17.9	68.4	2 08.7	67.8	10
7 00	0 04.9	72.0	0 55.4	71.5	1 45.9	71.0	2 36.4	70.4	3 26.8	69.9	7 00
6 50	1 25.2	74.1	2 15.3	73.6	3 05.7	73.0	3 55.9	72.5	4 46.1	71.9	6 50
40	2 46.2	76.2	3 36.3	75.6	4 26.3	75.1	5 16.3	74.5	6 06.3	74.0	40
30	4 08.0	78.2	4 57.8	77.7	5 47.8	77.1	6 37.5	76.5	7 27.2	76.0	30
20	5 30.4	80.3	6 20.1	79.7	7 09.8	79.1	7 59.4	78.6	8 49.0	78.0	20
10	6 53.4	82.3	7 42.9	81.7	8 32.5	81.1	9 21.9	80.6	10 11.4	80.0	10
6 00	8 16.6	84.4	9 06.1	83.8	9 55.5	83.2	10 44.9	82.6	11 34.2	82.1	6 00
5 50	9 40.2	86.4	10 29.6	85.8	11 18.9	85.2	12 08.3	84.7	12 57.5	84.1	5 50
40	11 04.1	88.5	11 53.4	87.9	12 42.7	87.3	13 31.9	86.7	14 21.0	86.1	40
30	12 27.9	90.5	13 17.2	90.0	14 06.5	89.4	14 55.8	88.8	15 44.8	88.2	30
20	13 51.8	92.6	14 41.1	92.1	15 30.4	91.5	16 19.6	90.9	17 08.7	90.3	20
10	15 15.4	94.7	16 04.8	94.1	16 54.1	93.6	17 43.5	93.0	18 32.4	92.4	10
5 00	16 38.9	96.9	17 28.4	96.3	18 17.8	95.7	19 07.1	95.1	19 56.3	94.5	5 00
4 50	18 01.9	99.0	18 51.5	98.4	19 41.1	97.8	20 30.5	97.2	21 19.8	96.6	4 50
40	19 24.6	101.1	20 14.4	100.6	21 04.0	100.0	21 53.5	99.3	22 42.9	98.7	40
30	20 46.6	103.3	21 36.4	102.7	22 26.3	102.1	23 16.0	101.5	24 05.5	100.9	30
20	22 07.8	105.5	22 57.9	104.9	23 47.9	104.3	24 37.8	103.7	25 27.6	103.1	20
10	23 28.1	107.8	24 18.5	107.2	25 08.8	106.6	25 58.9	106.0	26 48.8	105.3	10
4 00	24 47.5	110.1	25 38.2	109.5	26 28.7	108.9	27 19.1	108.2	28 09.3	107.6	4 00
3 50	26 05.6	112.4	26 56.5	111.8	27 47.5	111.2	28 38.2	110.6	29 28.2	109.9	3 50
40	27 22.5	114.7	28 13.9	114.1	29 05.0	113.5	29 56.0	112.9	30 46.9	112.3	40
30	28 38.1	117.1	29 29.7	116.5	30 21.3	115.9	31 12.7	115.3	32 03.8	114.7	30
20	29 51.8	119.6	30 43.9	119.0	31 35.8	118.4	32 27.6	117.8	33 19.2	117.2	20
10	31 03.9	122.1	31 56.3	121.5	32 48.8	120.9	33 41.1	120.3	34 33.0	119.7	10
3 00	32 14.0	124.6	33 07.0	124.0	33 59.8	123.5	34 52.5	122.9	35 45.0	122.3	3 00
2 50	33 21.9	127.2	34 15.3	126.6	35 08.7	126.1	36 01.8	125.5	36 54.8	124.8	2 50
40	34 27.6	129.9	35 21.5	129.3	36 15.3	128.8	37 08.9	128.2	38 02.4	127.6	40
30	35 30.7	132.6	36 25.1	132.0	37 19.4	131.5	38 13.7	131.0	39 07.5	130.4	30
20	36 31.1	135.3	37 26.0	134.8	38 20.8	134.3	39 15.5	133.8	40 10.1	133.3	20
10	37 28.5	138.2	38 24.0	137.7	39 19.3	137.2	40 14.5	136.7	41 09.6	136.1	10
2 00	38 22.8	141.1	39 18.8	140.6	40 14.7	140.1	41 10.5	139.7	42 06.2	139.2	2 00
1 50	39 13.8	144.1	40 10.2	143.6	41 06.7	143.2	42 03.1	142.7	42 59.2	142.2	1 50
40	40 01.3	147.1	40 58.3	146.7	41 55.2	146.3	42 52.1	145.8	43 48.8	145.4	40
30	40 44.9	150.2	41 42.4	149.8	42 39.8	149.4	43 37.2	149.0	44 34.5	148.6	30
20	41 24.7	153.3	42 22.6	153.0	43 20.5	152.6	44 18.4	152.3	45 16.2	151.9	20
10	42 00.2	156.5	42 58.6	156.2	43 56.9	155.9	44 54.3	155.6	45 53.6	155.2	10
1 00	42 31.4	159.8	43 30.2	159.5	44 28.9	159.2	45 27.7	158.9	46 26.4	158.6	1 00
0 50	42 58.1	163.1	43 57.3	162.8	44 56.5	162.6	45 55.6	162.4	46 54.7	162.1	0 50
40	43 20.2	166.4	44 19.7	166.2	45 19.1	166.0	46 18.5	165.8	47 18.0	165.6	40
30	43 37.5	169.8	44 37.2	169.6	45 36.9	169.5	46 36.7	169.3	47 36.2	169.2	30
20	43 50.0	173.2	44 49.9	173.1	45 49.7	173.0	46 49.6	172.9	47 49.4	172.8	20
10	43 57.5	176.6	44 57.5	176.5	45 57.4	176.5	46 57.4	176.4	47 57.4	176.4	10
0 00	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00									0 19.0	55.0	8 00
7 50							0 36.6	57.6	1 28.6	57.1	7 50
40			0 04.6	60.6	0 56.3	60.2	1 48.1	59.6	2 39.8	59.1	40
30	0 27.1	63.2	1 18.4	62.7	2 09.8	62.2	3 01.1	61.6	3 52.5	61.1	30
20	1 42.6	65.2	2 33.6	64.7	3 24.6	64.2	4 15.7	63.7	5 06.6	63.2	20
10	2 59.3	67.3	3 50.0	66.7	4 40.7	66.2	5 31.5	65.7	6 22.1	65.2	10
7 00	4 17.3	69.3	5 07.7	68.8	5 58.1	68.2	6 48.4	67.7	7 38.8	67.2	7 00
6 50	5 36.2	71.4	6 26.4	70.8	7 16.5	70.3	8 06.7	69.7	8 56.7	69.2	6 50
40	6 56.2	73.4	7 46.1	72.8	8 36.0	72.3	9 25.8	71.7	10 15.5	71.2	40
30	8 17.0	75.4	9 06.7	74.8	9 56.2	74.3	10 45.9	73.7	11 35.4	73.1	30
20	9 38.5	77.4	10 28.0	76.9	11 17.4	76.3	12 06.7	75.7	12 56.0	75.1	20
10	11 00.7	79.5	11 49.9	78.9	12 39.2	78.3	13 29.0	77.7	14 17.5	77.1	10
6 00	12 23.4	81.5	13 12.6	80.9	14 01.7	80.3	14 50.7	79.7	15 39.6	79.1	6 00
5 50	13 46.6	83.5	14 35.7	82.9	15 24.6	82.3	16 13.4	81.7	17 02.2	81.1	5 50
40	15 10.1	85.6	15 59.0	85.0	16 47.9	84.4	17 36.6	83.7	18 25.3	83.1	40
30	16 33.8	87.6	17 22.7	87.0	18 11.4	86.4	19 00.1	85.7	19 48.7	85.1	30
20	17 57.7	89.7	18 46.5	89.1	19 35.2	88.4	20 23.9	87.8	21 12.4	87.2	20
10	19 21.5	91.7	20 10.4	91.1	20 59.1	90.5	21 47.8	89.9	22 36.2	89.3	10
5 00	20 45.4	93.8	21 34.3	93.2	22 23.1	92.6	23 11.7	92.0	24 00.2	91.3	5 00
4 50	22 08.8	96.0	22 57.8	95.3	23 46.7	94.7	24 35.4	94.1	25 23.8	93.4	4 50
40	23 32.1	98.1	24 21.2	97.5	25 10.1	96.8	25 58.9	96.2	26 47.5	95.5	40
30	24 54.9	100.3	25 44.1	99.6	26 33.1	99.0	27 22.1	98.4	28 10.8	97.7	30
20	26 17.2	102.5	27 06.6	101.8	27 55.8	101.5	28 44.9	100.6	29 33.8	99.9	20
10	27 38.6	104.7	28 28.1	104.1	29 17.7	103.4	30 07.0	102.8	30 56.0	102.1	10
4 00	28 59.4	107.0	29 49.2	106.4	30 38.9	105.7	31 28.4	105.1	32 17.7	104.4	4 00
3 50	30 19.0	109.3	31 09.1	108.7	31 59.1	108.0	32 48.9	107.4	33 38.5	106.7	3 50
40	31 37.6	111.7	32 28.1	111.1	33 18.4	110.4	34 08.5	109.7	34 58.4	109.1	40
30	32 54.8	114.1	33 45.7	113.5	34 36.3	112.8	35 26.8	112.2	36 17.0	111.5	30
20	34 10.7	116.6	35 01.9	116.0	35 52.9	115.3	36 43.8	114.7	37 34.4	114.0	20
10	35 24.8	119.1	36 16.5	118.5	37 07.9	117.8	37 59.2	117.2	38 50.2	116.5	10
3 00	36 37.3	121.7	37 29.4	121.1	38 21.3	120.4	39 13.0	119.8	40 04.5	119.1	3 00
2 50	37 47.5	124.3	38 40.1	123.7	39 32.5	123.1	40 24.8	122.5	41 16.8	121.8	2 50
40	38 55.7	127.1	39 48.8	126.5	40 41.7	125.8	41 34.5	125.2	42 27.0	124.6	40
30	40 01.3	129.8	40 55.0	129.3	41 58.5	128.7	42 41.8	128.0	43 34.9	127.4	30
20	41 04.5	132.7	41 58.7	132.1	42 52.7	131.5	43 46.6	130.9	44 40.3	130.3	20
10	42 04.5	135.6	42 59.3	135.1	43 53.9	134.5	44 48.5	133.9	45 42.7	133.3	10
2 00	43 01.7	138.7	43 57.1	138.1	44 52.3	137.6	45 47.3	137.0	46 42.2	136.4	2 00
1 50	43 55.1	141.7	44 51.2	141.2	45 47.1	140.7	46 42.8	140.2	47 38.2	139.6	2 50
40	44 45.5	144.9	45 42.0	144.4	46 38.4	143.9	47 34.7	143.4	48 30.8	142.9	40
30	45 31.7	148.2	46 28.8	147.7	47 25.8	147.3	48 22.7	146.8	49 19.2	146.3	30
20	46 14.0	151.5	47 11.6	151.1	48 09.1	150.7	49 06.5	150.2	50 03.9	149.8	20
10	46 51.7	154.9	47 49.9	154.5	48 47.8	154.1	49 45.8	153.7	50 43.7	153.3	10
1 00	47 25.1	158.3	48 23.7	158.0	49 22.2	157.7	50 20.7	157.3	51 19.2	157.0	1 00
0 50	47 53.7	161.8	48 52.7	161.6	49 51.5	161.3	50 50.6	161.0	51 49.4	160.7	0 50
40	48 17.3	165.4	49 16.7	165.2	50 16.0	164.9	51 15.3	164.7	52 14.6	164.5	40
30	48 35.8	169.0	49 35.5	168.8	50 35.1	168.7	51 34.8	168.5	52 34.4	168.3	30
20	48 49.3	172.7	49 49.1	172.5	50 48.9	172.4	51 48.8	172.3	52 48.6	172.2	20
10	48 57.2	176.3	49 57.2	176.3	50 57.2	176.2	51 57.2	176.1	52 57.2	176.1	10
0 00	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	1 11.5	54.5	2 04.0	54.0	2 56.5	53.5	3 49.0	53.0	4 41.4	52.5	8 00
7 50	2 20.6	56.5	3 12.8	56.1	4 04.8	55.6	4 56.9	55.1	5 48.9	54.5	7 50
40	3 31.5	58.6	4 23.2	58.1	5 14.8	57.6	6 06.4	57.1	6 58.0	56.5	40
30	4 43.8	60.6	5 35.2	60.1	6 26.3	59.6	7 17.7	59.0	8 08.7	58.5	30
20	5 57.6	62.6	6 48.5	62.1	7 39.4	61.6	8 30.3	61.0	9 21.1	60.5	20
10	7 12.7	64.6	8 03.4	64.1	8 53.7	63.5	9 44.3	63.0	10 34.7	62.4	10
7 00	8 29.0	66.6	9 19.3	66.1	10 09.5	65.5	10 59.6	64.9	11 49.7	64.4	7 00
6 50	9 46.6	68.6	10 36.6	68.0	11 26.4	67.4	12 16.2	66.8	13 05.8	66.3	6 50
40	11 05.2	70.6	11 54.8	70.0	12 44.4	69.4	13 33.9	68.8	14 23.3	68.2	40
30	12 24.8	72.5	13 14.2	72.0	14 03.5	71.4	14 52.6	70.8	15 41.6	70.2	30
20	13 45.2	74.5	14 34.3	73.9	15 23.3	73.3	16 12.3	72.7	17 01.1	72.1	20
10	15 06.5	76.5	15 55.4	75.9	16 44.1	75.3	17 32.8	74.7	18 21.4	74.1	10
6 00	16 28.4	78.5	17 17.1	77.9	18 05.6	77.3	18 54.1	76.7	19 42.4	76.0	6 00
5 50	17 50.7	80.5	18 39.3	79.9	19 27.7	79.2	20 16.0	78.6	21 04.1	78.0	5 50
40	19 13.8	82.5	20 02.2	81.9	20 50.4	81.2	21 38.6	80.6	22 26.5	80.0	40
30	20 37.1	84.5	21 25.4	83.9	22 13.5	83.2	23 01.4	82.6	23 49.2	81.9	30
20	22 00.7	86.5	22 48.9	85.9	23 36.9	85.2	24 24.8	84.6	25 12.5	83.9	20
10	23 24.6	88.6	24 12.7	87.9	25 00.6	87.2	25 48.5	86.6	26 36.0	85.9	10
5 00	24 48.5	90.7	25 36.6	90.0	26 24.5	89.3	27 12.3	88.6	27 59.8	87.9	5 00
4 50	26 12.2	92.8	27 00.4	92.1	27 48.2	91.4	28 36.2	90.7	29 23.6	90.0	4 50
40	27 35.9	94.9	28 24.2	94.2	29 12.1	93.5	29 59.9	92.8	30 47.5	92.1	40
30	38 59.3	97.0	29 47.7	96.3	30 35.7	95.6	31 23.7	94.9	32 11.2	94.2	30
20	30 22.4	99.2	31 10.9	98.5	31 59.1	97.8	32 47.1	97.1	33 34.8	96.4	20
10	31 44.8	101.4	32 33.5	100.7	33 21.8	100.0	34 10.1	99.3	34 57.9	98.6	10
4 00	33 06.8	103.7	33 55.7	103.0	34 44.3	102.3	35 32.6	101.6	36 20.7	100.8	4 00
3 50	34 27.8	106.0	35 16.9	105.3	36 05.7	104.6	36 54.3	103.9	37 42.6	103.1	3 50
40	35 48.1	108.4	36 37.5	107.7	37 26.6	106.9	38 15.5	106.2	39 04.0	105.4	40
30	37 07.0	110.8	37 56.7	110.1	38 46.1	109.3	39 35.4	108.6	40 24.2	107.8	30
20	38 24.8	113.3	39 14.9	112.6	40 04.7	111.8	40 54.3	111.1	41 43.6	110.3	20
10	39 41.0	115.8	40 31.6	115.1	41 21.9	114.4	42 11.9	113.6	43 01.5	112.8	10
3 00	40 55.7	118.4	41 46.7	117.7	42 37.5	117.0	43 28.0	116.3	44 18.1	115.5	3 00
2 50	42 08.5	121.1	43 00.0	120.4	43 51.4	119.7	44 42.2	119.0	45 32.9	118.2	2 50
40	43 19.3	123.9	44 11.3	123.2	45 03.1	122.5	45 54.7	121.8	46 45.9	121.1	40
30	44 27.7	126.8	45 20.3	126.1	46 12.7	125.4	47 04.9	124.7	47 56.6	124.0	30
20	45 33.7	129.7	46 26.9	129.0	47 19.9	128.3	48 12.7	127.6	49 05.1	126.9	20
10	46 36.7	132.7	47 30.5	132.1	48 24.2	131.4	49 17.7	130.7	50 10.7	130.0	10
2 00	47 36.8	135.8	48 31.3	135.2	49 25.7	134.5	50 19.8	133.9	51 13.6	133.2	2 00
1 50	48 33.6	139.0	49 28.7	138.4	50 23.7	137.8	51 18.5	137.2	52 12.9	136.5	1 50
40	49 26.8	142.4	50 22.6	141.8	51 18.3	141.2	52 13.8	140.6	53 09.0	140.0	40
30	50 16.0	145.8	51 12.5	145.2	52 08.7	144.7	53 05.0	144.1	54 00.9	143.5	30
20	51 01.1	149.3	51 58.2	148.8	52 55.2	148.3	53 52.1	147.7	54 48.7	147.2	20
10	51 41.6	152.9	52 39.3	152.4	53 36.8	152.0	54 34.4	151.5	55 31.6	151.0	10
1 00	52 17.5	156.6	53 15.8	156.2	54 13.9	155.8	55 12.1	155.3	56 10.0	154.9	1 00
0 50	52 48.2	160.3	53 47.0	160.0	54 45.7	159.7	55 44.4	159.3	56 42.9	159.0	0 50
40	53 13.8	164.2	54 13.0	163.9	55 12.2	163.6	56 11.3	163.3	57 10.4	163.1	40
30	53 33.9	168.1	54 33.5	167.9	55 32.9	167.6	56 32.5	167.4	57 31.9	167.2	30
20	53 48.4	172.0	54 48.2	171.9	55 47.9	171.7	56 47.7	171.6	57 47.4	171.4	20
10	53 57.1	176.0	54 57.0	175.9	55 57.0	175.8	56 57.0	175.8	57 56.9	175.7	10
0 00	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	58 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 23.9	92.1	0 34.2	92.6							5 50
40	2 47.5	94.2	1 57.7	94.7	1 07.9	95.3	0 18.1	95.8			40
30	4 11.2	96.2	3 21.3	96.8	2 31.3	97.3	1 41.5	97.9	0 51.5	98.5	30
20	5 34.3	98.3	4 44.3	98.9	3 54.3	99.4	3 04.3	100.0	2 14.2	100.5	20
10	6 57.1	100.4	6 06.8	101.0	5 16.8	101.5	4 26.6	102.1	3 36.4	102.6	10
5 00	8 19.3	102.5	7 29.0	103.1	6 38.7	103.6	5 48.3	104.2	4 57.9	104.7	5 00
4 50	9 40.8	104.6	8 50.3	105.2	7 59.8	105.7	7 09.3	106.3	6 18.6	106.8	4 50
40	11 01.6	106.8	10 10.9	107.3	9 20.1	107.9	8 29.3	108 4	7 38.4	108.9	40
30	12 21.4	108.9	11 30.5	109.5	10 39.4	110.0	9 48.4	110.6	8 57.2	111.1	30
20	13 40.1	111.1	12 48.9	111.7	11 57.6	112.2	11 06.3	112.8	10 14.9	113.3	20
10	14 57.8	113.3	14 06.3	113.9	13 14.8	114.4	12 22.9	114.9	11 31.3	115.4	10
4 00	16 14.2	115.6	15 22.4	116.1	14 30.4	116.6	13 38.5	117.1	12 46.4	117.6	4 00
3 50	17 29.1	117.8	16 37.0	118.4	15 44.6	118.9	14 52.3	119.4	13 59.8	119.8	3 50
40	18 42.5	120.1	17 50.0	120.7	16 57.3	121.2	16 04.6	121.7	15 11.8	122.1	40
30	19 54.1	122.4	19 01.2	123.0	18 08.2	123.5	17 15.1	124.0	16 21.9	124.4	30
20	21 04.0	124.8	20 10.6	125.3	19 17.2	125.8	18 23.6	126.3	17 30.0	126.7	20
10	22 11.8	127.2	21 18.0	127.7	20 24.2	128.2	19 30.2	128.7	18 36.2	129.1	10
3 00	23 17.5	129.7	22 23.3	130.1	21 29.0	130.6	20 34.6	131.1	19 40.2	131.5	3 00
2 50	24 20.9	132.2	23 26.3	132.6	22 31.6	133.0	21 36.8	133.5	20 41.9	133.9	2 50
40	25 21.8	134.7	24 26.7	135.1	23 31.5	135.5	22 36.3	136.0	21 41.0	136.4	40
30	26 20.1	137.2	25 24.6	137.6	24 29.1	138.0	23 33.3	138.5	22 37.7	138.9	30
20	27 15.7	139.8	26 19.7	140.2	25 23.7	140.6	24 27.6	141.0	23 31.4	141.4	20
10	28 08.3	142.4	27 11.9	142.8	26 15.4	143.2	25 18.8	143.6	24 22.2	144.0	10
2 00	28 57.9	145.1	28 01.0	145.5	27 04.1	145.9	26 07.1	146.2	25 10.0	146.6	2 00
1 50	29 44.1	147.9	28 46.8	148.2	27 49.5	148.5	26 52.1	148.8	25 54.7	149.2	1 50
40	30 27.0	150.7	29 29.3	151.0	28 31.5	151.3	27 33.7	151.6	26 35.9	151.9	40
30	31 06.3	153.5	30 08.2	153.7	29 10.1	154.0	28 11.9	154.3	27 13.7	154.6	30
20	31 42.0	156.3	30 43.5	156.5	29 45.0	156.8	28 46.4	157.1	27 47.8	157.3	20
10	32 13.7	159.2	31 14.9	159.4	30 16.2	159.6	29 17.2	159.9	28 18.3	160.1	10
1 00	32 41.6	162.1	31 42.5	162.3	30 43.3	162.5	29 44.2	162.7	28 45.0	162.9	1 00
0 50	33 05.3	165.0	32 05.9	165.2	31 06.6	165.4	30 07.2	165.5	29 07.8	165.7	0 50
40	33 24.9	168.0	32 25.3	168.1	31 25.7	168.3	30 26.1	168.4	29 26.5	168.5	40
30	33 40.2	171.0	32 40.4	171.1	31 40.7	171.2	30 40.8	171.3	29 41.1	171.3	30
20	33 51.2	174.0	32 51.3	174.0	31 51.4	174.1	30 51.4	174.2	29 51.5	174.2	20
10	33 57.8	177.0	32 57.8	177.0	31 57.8	177.0	30 57.8	177.1	29 57.8	177.1	10
0 00	34 0.0	180.0	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 30	0 01.5	99.0									5 30
20	1 24.2	101.1	0 34.1	101.6							20
10	2 46.2	103.2	1 55.9	103.7	1 05.7	104.2	0 15.4	104.8			10
5 00	4 07.5	105.3	3 17.0	105.8	2 26.6	106.3	1 36.1	106.9	0 45.6	107.4	5 00
4 50	5 28.0	107.4	4 37.3	107.9	3 46.6	108.4	2 55.9	109.0	2 05.1	109.5	4 50
40	6 47.5	109.5	5 56.6	110.0	5 05.7	110.5	4 14.7	111.1	3 23.7	111.6	40
30	8 06.1	111.6	7 14.9	112.1	6 23.7	112.6	5 32.4	113.2	4 41.2	113.7	30
20	9 23.5	113.8	8 32.0	114.3	7 40.5	114.8	6 48.9	115.3	5 57.3	115.9	20
10	10 39.5	115.9	9 47.8	116.5	8 55.9	117.0	8 04.0	117.5	7 12.0	118.0	10
4 00	11 54.3	118.1	11 02.2	118.7	10 10.0	119.2	9 17.7	119.7	8 25.4	120.2	4 00
3 50	13 07.4	120.4	12 14.9	120.9	11 22.4	121.4	10 29.7	121.9	9 37.0	122.4	3 50
40	14 19.0	122.6	13 26.1	123.1	12 33.1	123.6	11 40.1	124.1	10 47.0	124.6	40
30	15 28.7	124.9	14 35.4	125.4	13 42.1	125.9	12 48.7	126.3	11 55.2	126.8	30
20	16 36.4	127.2	15 42.8	127.7	14 49.1	128.2	13 55.3	128.6	13 01.4	129.1	20
10	17 42.2	129.5	16 48.2	130.0	15 53.9	130.5	14 59.7	130.9	14 05.4	131.4	10
3 00	18 45.7	131.9	17 51.2	132.4	16 56.6	132.8	16 02.0	133.2	15 07.3	133.7	3 00
2 50	19 46.9	134.3	18 52.1	134.8	17 57.0	135.2	17 01.9	135.6	16 06.7	136.0	2 50
40	20 45.7	136.8	19 50.3	137.2	18 54.8	137.6	17 59.3	138.0	17 03.7	138.4	40
30	21 41.8	139.3	20 46.0	139.7	19 50.1	140.0	18 54.1	140.4	17 58.1	140.8	30
20	22 35.2	141.8	21 38.9	142.2	20 42.6	142.5	19 46.2	142.9	18 49.7	143.3	20
10	23 25.6	144.3	22 28.9	144.7	21 32.2	145.0	20 35.4	145.4	19 38.4	145.7	10
2 00	24 13.1	146.9	23 15.9	147.2	22 18.7	147.5	21 21.5	147.9	20 24.2	148.2	2 00
1 50	24 57.1	149.5	23 59.6	149.8	23 02.1	150.1	22 04.5	150.4	21 06.8	150.7	1 50
40	25 38.0	152.2	24 40.1	152.5	23 42.2	152.7	22 44.2	153.0	21 46.2	153.3	40
30	26 15.3	154.8	25 17.2	155.1	24 18.9	155.3	23 20.5	155.6	22 22.1	155.9	30
20	26 49.3	157.5	25 50.7	157.8	24 52.1	158.0	23 53.5	158.3	22 54.8	158.5	20
10	27 19.4	160.3	26 20.6	160.5	25 21.7	160.7	24 22.6	160.9	23 23.6	161.1	10
1 00	27 45.8	163.1	26 46.6	163.2	25 47.4	163.4	24 48.2	163.6	23 48.9	163.8	1 00
0 50	28 08.2	165.9	27 08.8	166.0	26 09.5	166.2	25 09.9	166.3	24 10.5	166.5	0 50
40	28 26.9	168.7	27 27.2	168.8	26 27.6	168.9	25 27.9	169.0	24 28.3	169.1	40
30	28 41.1	171.5	27 41.5	171.6	26 41.8	171.7	25 41.9	171.7	24 42.1	171.8	30
20	28 51.6	174.3	27 51.8	174.4	26 51.9	174.4	25 52.0	174.5	24 52.1	174.5	20
10	28 57.8	177.1	27 57.9	177.2	26 57.9	177.2	25 58.1	177.2	24 58.0	177.3	10
0 00	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	1 14.4	110.0	0 23.6	110.6							4 50
40	2 32.7	112.1	1 41.7	112.7	0 50.6	113.2					40
30	3 49.8	114.2	2 58.4	114.8	2 07.0	115.3	1 15.7	115.8	0 24.4	116.3	30
20	5 05.7	116.4	4 14.0	116.9	3 22.3	117.4	2 30.6	117.9	1 38.9	118.4	20
10	6 20.0	118.5	5 28.1	119.0	4 36.0	119.5	3 43.8	120.0	2 51.8	120.5	10
4 00	7 33.0	120.7	6 40.6	121.2	5 48.2	121.6	4 55.8	122.1	4 03.4	122.6	4 00
3 50	8 44.3	122.8	7 51.6	123.3	6 58.7	123.8	6 06.0	124.2	5 13.1	124.7	3 50
40	9 53.9	125.0	9 00.8	125.5	8 07.6	126.0	7 14.4	126.4	6 21.2	126.9	40
30	11 01.7	127.2	10 08.1	127.7	9 14.6	128.2	8 20.9	128.6	7 27.2	129.1	30
20	12 07.4	129.5	11 13.4	130.0	10 19.4	130.4	9 25.4	130.8	8 31.4	131.2	20
10	13 11.1	131.8	12 16.7	132.2	11 22.3	132.6	10 27.8	133.1	9 33.3	133.5	10
3 00	14 12.5	134.1	13 17.7	134.5	12 22.8	134.9	11 27.9	135.3	10 33.0	135.7	3 00
2 50	15 11.6	136.4	14 16.3	136.8	13 21.0	137.2	12 25.7	137.6	11 30.4	138.0	2 50
40	16 08.1	138.8	15 12.4	139.2	14 16.7	139.6	13 21.0	140.0	12 25.2	140.3	49
30	17 02.1	141.2	16 06.0	141.5	15 09.9	141.9	14 13.7	142.3	13 17.5	142.6	30
20	17 53.2	143.6	16 56.7	143.9	16 00.1	144.3	15 03.6	144.7	14 07.0	145.0	20
10	18 41.6	146.0	17 44.7	146.3	16 47.6	146.7	15 50.7	147.0	14 53.7	147.4	10
2 00	19 26.9	148.5	18 29.6	148.8	17 32.2	149.1	16 34.8	149.4	15 37.5	149.8	2 00
1 50	20 09.2	151.0	19 11.4	151.3	18 13.7	151.6	17 15.9	151.9	16 18.1	152.2	1 50
40	20 48.2	153.6	19 50.1	153.8	18 52.0	154.1	17 53.9	154.4	16 55.7	154.6	40
30	21 23.8	156.1	20 25.4	156.4	19 26.9	156.6	18 28.4	156.9	17 30.1	157.1	30
20	21 56.0	158.7	20 57.3	158.9	19 58.5	159.1	18 59.8	159.4	18 01.0	159.6	20
10	22 24.7	161.3	21 25.7	161.5	20 26.6	161.7	19 27.6	161.9	18 28.6	162.1	10
1 00	22 49.7	164.0	21 50.4	164.1	20 51.1	164.3	19 51.8	164.5	18 52.6	164.6	1 00
0 50	23 11.0	166.6	22 11.6	166.7	21 12.1	166.9	20 12.5	167.0	19 13.1	167.1	0 50
40	23 28.6	169.3	22 29.0	169.4	21 29.3	169.5	20 39.6	169.6	19 30.0	169.7	40
30	23 42.3	171.9	22 42.5	172.0	21 42.6	172.1	20 42.8	172.2	19 43.1	172.2	30
20	23 52.2	174.6	22 52.2	174.7	21 52.3	174.7	20 52.4	174.8	19 52.5	174.8	20
10	23 58.1	177.3	22 58.1	177.3	21 58.1	177.3	20 58.1	177.4	19 58.1	177.4	10
0 00	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 20	0 47.1	118.9									4 20
10	1 59.8	121.0	1 07.7	121.5	0 15.7	122.0					10
4 00	3 11.0	123.1	2 18.5	123.6	1 26.0	124.1	0 33.5	124.5			4 00
3 50	4 20.2	125.2	3 27.4	125.7	2 34.6	126.2	1 41.7	126.6	0 48.7	127.1	3 50
40	5 28.0	127.4	4 34.7	127.8	3 41.4	128.3	2 48.1	128.7	1 54.8	129.2	40
30	6 33.6	129.5	5 39.9	129.9	4 46.1	130.4	3 52.5	130.8	2 58.7	131.3	30
20	7 37.3	131.7	6 43.2	132.1	5 49.1	132.6	4 54.9	133.0	4 00.7	133.4	20
10	8 38.8	133.9	7 44.2	134.3	6 49.8	134.8	5 55.1	135.2	5 00.5	135.6	10
3 00	9 38.1	136.2	8 43.1	136.6	7 48.1	137.0	6 53.1	137.4	5 58.1	137.8	3 00
2 50	10 35.0	138.4	9 39.7	138.8	8 44.1	139.2	7 48.7	139.6	6 53.2	139.9	2 50
40	11 29.4	140.7	10 33.6	141.1	9 37.7	141.4	8 41.8	141.8	7 45.9	142.1	40
30	12 21.1	143.0	11 25.0	143.4	10 28.8	143.7	9 32.4	144.0	8 36.1	144.4	30
20	13 10.4	145.3	12 13.8	145.7	11 17.1	146.0	10 20.3	146.3	9 23.6	146.7	20
10	13 56.7	147.7	12 59.7	148.0	12 02.5	148.3	11 05.4	148.6	10 08.2	148.9	10
2 00	14 40.0	150.1	13 42.6	150.4	12 45.1	150.6	11 47.6	150.9	10 50.1	151.2	2 00
1 50	15 20.3	152.5	14 22.6	152.7	13 24.8	153.0	12 26.9	153.2	11 29.0	153.5	1 50
40	15 57.6	154.9	14 59.4	155.1	14 01.2	155.4	13 03.0	155.6	12 04.8	155.9	40
30	16 31.5	157.3	15 33.1	157.5	14 34.7	157.8	13 36.1	158.0	12 37.5	158.2	30
20	17 02.3	159.8	16 03.5	160.0	15 04.7	160.2	14 05.9	160.4	13 07.0	160.6	20
10	17 29.5	162.3	16 30.4	162.4	15 31.4	162.6	14 32.2	162.8	13 33.2	163.0	10
1 00	17 53.3	164.8	16 54.0	164.9	15 54.7	165.1	14 55.4	165.2	13 56.1	165.4	1 00
0 50	18 13.5	167.3	17 14.1	167.4	16 14.6	167.5	15 15.0	167.6	14 15.4	167.8	0 50
40	18 30.3	169.8	17 30.6	169.9	16 30.9	170.0	15 31.2	170.1	14 31.5	170.2	40
30	18 43.1	172.3	17 43.4	172.4	16 43.6	172.5	15 43.8	172.6	14 43.9	172.7	30
20	18 52.6	174.9	17 52.7	174.9	16 52.8	175.0	15 52.9	175.1	14 52.9	175.1	20
10	18 58.1	177.4	17 58.1	177.4	16 58.2	177.5	15 58.2	177.5	14 58.2	177.5	10
0 00	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	15 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 40	1 01.5	129.7	0 08.2	130.1							3 40
30	2 04.9	131.8	1 11.2	132.2	0 17.4	132.7					30
20	3 06.5	133.9	2 12.3	134.3	1 18.1	134.7	0 23.9	135.2			20
10	4 05.8	136.0	3 11.2	136.4	2 16.7	136.8	1 21.8	137.3	0 27.2	137.7	10
3 00	5 03.0	138.2	4 08.0	138.6	3 12.9	139.0	2 17.8	139.4	1 22.7	139.8	3 00
2 50	5 57.7	140.3	5 02.2	140.7	4 06.8	141.1	3 11.1	141.5	2 15.6	141.9	2 50
40	6 50.0	142.5	5 54.1	142.9	4 58.1	143.3	4 02.2	143.6	3 06.2	144.0	40
30	7 39.7	144.7	6 43.4	145.1	5 47.1	145.4	4 50.6	145.8	3 54.2	146.1	30
20	8 26.8	147.0	7 30.1	147.3	6 33.3	147.6	5 36.5	148.0	4 39.7	148.3	20
10	9 11.1	149.2	8 14.0	149.5	7 16.8	149.8	6 19.6	150.2	5 22.3	150.5	10
2 00	9 52.6	151.5	8 55.1	151.8	7 57.5	152.1	7 00.0	152.4	6 02.4	152.7	2 00
1 50	10 31.1	153.8	9 33.2	154.1	8 35.3	154.3	7 37.3	154.6	6 39.4	154.9	1 50
40	11 06.6	156.1	10 08.4	156.4	9 10.1	156.6	8 11.9	156.9	7 13.6	157.1	40
30	11 38.9	158.4	10 40.4	158.7	9 41.9	158.9	8 43.2	159.1	7 44.7	159.3	30
20	12 08.2	160.8	11 09.4	161.0	10 10.5	161.2	9 11.7	161.4	8 12.8	161.6	20
10	12 34.1	163.2	11 35.0	163.4	10 35.8	163.5	9 36.7	163.7	8 37.6	163.9	10
1 00	12 56.8	165.6	11 57.4	165.7	10 58.1	165.8	9 58.7	166.0	8 59.3	166.2	1 00
0 50	13 15.9	167.9	12 16.4	168.0	11 16.9	168.1	10 17.3	168.3	9 17.7	168.4	0 50
40	13 31.8	170.3	12 32.1	170.4	11 32.4	170.5	10 32.7	170.6	9 33.0	170.7	40
30	13 44.1	172.7	12 44.3	172.8	11 44.4	172.9	10 44.6	173.0	9 44.8	173.0	30
20	13 53.0	175.2	12 53.1	175.2	11 53.1	175.3	10 53.2	175.3	9 53.2	175.4	20
10	13 58.2	177.6	12 58.2	177.6	11 58.2	177.6	10 58.3	177.6	9 58.3	177.7	10
0 00	14 0.0	180.0	13 0.0	180.0	12 0.0	180.0	11 0.0	180.0	10 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 38.4	83.6	6 20
10					0 19.0	86.8	1 09.3	86.3	1 59.7	85.7	10
6 00	0 00.0	90.0	0 50.4	89.5	1 40.7	88.9	2 30.9	88.4	3 21.2	87.8	6 00
5 50	1 21.7	92.1	2 12.1	91.5	3 02.4	91.0	3 52.6	90.5	4 43.0	89.9	5 50
40	2 43.2	94.2	3 33.5	93.6	4 23.9	93.1	5 14.3	92.6	6 04.6	92.0	40
30	4 04.6	96.3	4 55.1	95.7	5 45.4	95.2	6 35.8	94.7	7 26.2	94.1	30
20	5 25.6	98.4	6 16.2	97.9	7 06.7	97.3	7 57.1	96.3	8 47.5	96.2	20
10	6 46 2	100.5	7 36.9	100.0	8 27.4	99.4	9 18.1	98.9	10 08.6	98.4	10
5 00	8 06.2	102.7	8 57.0	102.1	9 47.7	101.6	10 38.5	101.0	11 29.1	100.5	5 00
4 50	9 25.6	104.8	10 16.6	104.3	11 07.4	103.7	11 58.3	103.2	12 49.2	102.6	4 50
40	10 44.1	107.0	11 35.3	106.4	12 26.5	105.9	13 17.6	105.4	14 08.5	104.8	40
30	12 01.8	109.2	12 53.2	108.6	13 44.6	108.1	14 35.9	107.6	15 27.1	107.0	30
20	13 18.5	111.4	14 10.1	110.8	15 01.7	110.3	15 53.3	109.8	16 44.7	109.2	20
10	14 33.9	113.6	15 25.9	113.1	16 17.8	112.5	17 09.5	112.0	18 01.3	111.5	10
4 00	15 48.1	115.8	16 40.4	115.3	17 32.6	114.8	18 24.7	114.3	19 16.7	113.8	4 00
3 50	17 00.9	118.1	17 53.6	117.6	18 46.0	117.1	19 38.4	116.6	20 30.8	116.1	3 50
40	18 12.2	120.4	19 05.2	119.9	19 58.0	119.4	20 50.8	118.9	21 43.4	118.4	40
30	19 21.8	122.7	20 15.2	122.3	21 08.3	121.8	22 01.4	121.3	22 54.5	120.8	30
20	20 29.6	125.1	21 23.2	124.7	22 16.9	124.2	23 10.4	123.7	24 03.8	123.2	20
10	21 35.4	127.5	22 29.5	127.1	23 23.4	126.6	24 17.3	126.1	25 11.2	125.6	10
3 00	22 29.1	130.0	23 33.5	129.5	24 28.0	129.1	25 22.4	128.6	26 16.5	128.1	3 00
2 50	23 40.5	132.5	24 35.4	132.0	25 30.2	131.6	26 34.9	131.1	27 19.7	130.6	2 50
40	24 39.5	135.0	25 34.8	134.6	26 30.1	134.1	27 25.3	133.7	28 20.4	133.2	40
30	25 36.0	137.6	26 31.8	137.1	27 27.5	136.7	28 23.1	136.3	29 18.6	135.8	30
20	26 29.8	140.2	27 25.9	139.8	28 22.1	139.4	29 18.1	139.0	30 14.1	138.5	20
10	27 20.6	142.8	28 17.3	142.4	29 13.9	142.1	30 10.3	141.7	31 06.8	141.2	10
2 00	28 08.6	145.5	29 05.6	145.1	30 02.7	144.8	30 59.6	144.4	31 56.4	144.0	2 00
1 50	28 53.3	148.2	29 50.8	147.8	30 48.2	147.5	31 45.4	147.2	32 42.8	146.8	1 50
40	29 34.7	150.9	30 32.5	150.6	31 30.3	150.3	32 28.0	150.0	33 25.7	149.7	40
30	30 12.6	153.7	31 10.9	153.4	32 09.1	153.1	33 07.2	152.9	34 05.2	152.6	30
20	30 47.0	256.5	31 45.6	156.3	32 44.1	156.0	33 42.6	155.8	34 41.0	155.5	20
10	31 17.6	159.4	32 16.6	159.2	33 15.4	158.9	34 14.2	158.7	35 13.1	158.5	10
1 00	31 44.5	162.3	32 43.6	162.1	33 42.7	161.9	34 41.8	161.7	35 40.9	161.5	1 00
0 50	32 07.3	165.2	33 06.8	165.0	34 06.2	164.9	35 05.6	164.7	36 04.9	164.5	0 50
40	32 26.2	168.1	33 25.8	168.0	34 25.5	167.9	35 25.0	167.7	36 24.6	167.6	40
30	32 40.9	171.0	33 40.8	171.0	34 40.5	170.9	35 40.2	170.8	36 40.1	170.7	30
20	32 51.5	174.0	33 51.4	174.0	34 51.3	173.9	35 51.2	173.8	36 51.1	173.8	20
10	32 57.9	177.0	33 57.9	177.0	34 57.8	176.9	35 57.8	176.9	36 57.8	176.9	10
0 00	33 0.0	180.0	34 0.0	180.0	35 0.0	180.0	36 0.0	180.0	37 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50									0 50.8	74.7	6 50
40					0 28.7	77.8	1 19.3	77.3	2 09.9	76.7	40
30	0 07.8	81.0	0 58.3	80.4	1 48.8	79.9	2 39.3	79.4	3 29.8	78.8	30
20	1 28.7	83.1	2 19.1	82.6	3 09.5	82.0	3 59.8	81.5	4 50.2	80.9	20
10	2 50.0	85.2	3 40.3	84.6	4 30.6	84.1	5 20.8	83.5	6 11.1	83.0	10
6 00	4 11.5	87.3	5 01.8	86.7	5 52.1	86.2	6 42.2	85.6	7 32.4	85.1	6 00
5 50	5 33.2	89.4	6 23.3	88.8	7 13.5	88.3	8 03.8	87.7	8 53.9	87.2	5 50
40	6 54.8	91.5	7 45.1	90.9	8 35.3	90.4	9 25.4	89.8	10 15.5	89.2	40
30	8 16.5	93.6	9 06.7	93.0	9 57.0	92.5	10 47.1	91.9	11 37.2	91.3	30
20	9 37.9	95.7	10 28.3	95.1	11 18.5	94.6	12 08.7	94.0	12 58.8	93.5	20
10	10 59.1	97.8	11 49.5	97.2	12 39.7	96.7	13 30.1	96.1	14 20.3	95.6	10
5 00	12 19.7	100.0	13 10.2	99.4	14 00.7	98.8	14 51.1	98.3	15 41.4	97.7	5 00
4 50	13 39.9	102.1	14 30.6	101.5	15 21.1	101.0	16 11.7	100.4	17 02.2	99.8	4 50
40	14 59.5	104.3	15 50.3	103.7	16 41.1	103.2	17 31.8	102.6	18 22.4	102.0	40
30	16 18.2	106.5	17 09.2	105.9	18 00.2	105.4	18 51.1	104.8	19 41.9	104.2	30
20	17 36.2	108.7	18 27.4	108.1	19 18.6	107.6	20 09.7	107.0	21 00.6	106.4	20
10	18 52.9	110.9	19 44.4	110.4	20 35.9	109.9	21 27.3	109.3	22 18.5	108.7	10
4 00	20 08.6	113.2	21 00.4	112.7	21 52.2	112.2	22 43.8	111.6	23 35.3	111.0	4 00
3 50	21 23.1	115.5	22 15.1	115.0	23 07.2	114.5	23 59.1	113.9	24 51.0	113.3	3 50
40	22 36.0	117.9	23 28.5	117.4	24 20.9	116.8	25 13.2	116.3	26 05.3	115.7	40
30	23 47.4	120.3	24 40.2	119.8	25 32.9	119.2	26 25.6	118.7	27 18.2	118.1	30
20	24 57.1	122.7	25 50.3	122.2	26 43.5	121.6	27 36.5	121.1	28 29.3	120.6	20
10	26 04.8	125.1	26 58.5	124.6	27 52.0	124.1	28 45.5	123.6	29 38.7	123.1	10
3 00	27 10.7	127.6	28 04.7	127.1	28 58.7	126.6	29 52.5	126.1	30 46.2	125.6	3 00
2 50	28 14.3	130.2	29 08.7	129.7	30 03.0	129.2	30 57.3	128.7	31 51.5	128.2	2 50
40	29 15.4	132.8	30 10.3	132.3	31 05.1	131.8	31 59.8	131.4	32 54.4	130.9	40
30	30 14.1	135.4	31 09.5	135.0	32 04.7	134.5	32 59.9	134.1	33 55.0	133.6	30
20	31 10.0	138.1	32 05.8	137.7	33 01.6	137.2	33 57.2	136.8	34 52.8	136.3	20
10	32 03.1	140.8	32 59.4	140.4	33 55.6	140.0	34 51.7	139.6	35 47.7	139.1	10
2 00	32 53.2	143.6	33 49.9	143.2	34 46.5	142.8	35 43.1	142.4	36 39.6	142.0	2 00
1 50	33 40.0	146.5	34 37.2	146.1	35 34.2	145.7	36 31.2	145.3	37 28.2	144.9	1 50
40	34 23.4	149.3	35 21.0	149.0	36 18.6	148.6	37 16.1	148.3	38 13.5	147.9	40
30	35 03.2	152.2	36 01.3	151.9	36 59.2	151.6	37 57.1	151.3	38 55.0	150.9	30
20	35 39.5	155.2	36 37.9	154.9	37 36.3	154.6	38 34.6	154.3	39 32.8	154.0	20
10	36 11.8	158.2	37 10.4	157.9	38 09.2	157.7	39 07.9	157.4	40 06.5	157.1	10
1 00	36 40.0	161.3	37 39.1	161.0	38 38.2	160.8	39 37.2	160.6	40 36.1	160.3	1 00
0 50	37 04.2	164.3	38 03.6	164.1	39 02.8	163.9	40 02.1	163.7	41 01.5	163.5	0 50
40	37 24.2	167.4	38 23.8	167.3	39 23.3	167.1	40 22.9	167.0	41 22.4	166.8	40
30	37 39.8	170.5	38 39.5	170.4	39 39.2	170.3	40 39.0	170.2	41 38.8	170.1	30
20	37 51.0	173.7	38 50.9	173.6	39 50.8	173.5	40 50.7	173.4	41 50.6	173.4	20
10	37 57.8	176.8	38 57.7	176.8	39 57.6	176.8	40 57.6	176.7	41 57.6	176.7	10
0 00	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30									0 02.4	63.6	7 30
20							0 24.6	66.3	1 16.2	65.8	20
10					0 48.1	68.9	1 40.0	68.4	2 31.3	67.8	10
7 00	0 23.4	72.0	1 14.5	71.5	2 05.5	71.0	2 56.5	70.5	3 47.4	69.9	7 00
6 50	1 41.6	74.1	2 32.3	73.6	3 23.1	73.0	4 13.9	72.5	5 04.7	72.0	6 50
40	3 00.5	76.2	3 51.2	75.7	4 41.7	75.1	5 32.3	74.6	6 22.9	74.1	40
30	4 20.2	78.3	5 10.6	77.7	6 01.0	77.2	6 51.4	76.6	7 41.8	76.1	30
20	5 40.5	80.4	6 30.8	79.8	7 21.0	79.3	8 11.2	78.7	9 01.4	78.2	20
10	7 01.3	82.4	7 51.4	81.9	8 41.5	81.3	9 31.7	80.8	10 21.8	80.2	10
6 00	8 22.4	84.5	9 12.5	84.0	10 02.5	83.4	10 52.5	82.8	11 42.4	82.3	6 00
5 50	9 43.9	86.6	10 33.9	86.0	11 23.7	85.5	12 13.7	84.9	13 03.6	84.3	5 50
40	11 05.6	88.7	11 55.5	88.1	12 45.4	87.6	13 35.2	87.0	14 24.9	86.4	40
30	12 27.2	90.8	13 17.1	90.2	14 06.9	89.6	14 56.8	89.1	15 46.4	88.5	30
20	13 48.9	92.9	14 38.8	92.3	15 28.7	91.7	16 18.5	91.2	17 08.2	90.6	20
10	15 10.4	95.0	16 00.3	94.4	16 50.5	93.8	17 40.2	93.3	18 29.9	92.7	10
5 00	16 31.6	97.2	17 21.7	96.6	18 11.7	96.0	19 01.6	95.4	19 51.4	94.8	5 00
4 50	17 52.4	99.3	18 42.7	98.7	19 32.8	98.1	20 22.8	97.5	21 12.7	96.9	4 50
40	19 12.8	101.5	20 03.2	100.9	20 53.5	100.3	21 43.6	99.7	22 33.6	99.1	40
30	20 32.5	103.7	21 23.1	103.1	22 13.4	102.5	23 03.8	101.9	23 53.9	101.3	30
20	21 51.6	105.9	22 42.3	105.3	23 32.9	104.8	24 23.4	104.2	25 13.7	103.6	20
10	23 09.6	108.2	24 00.6	107.6	24 51.5	107.0	25 42.1	106.4	26 32.8	105.8	10
4 00	24 26.7	110.5	25 18.0	109.9	26 09.1	109.3	27 00.0	108.7	27 50.9	108.1	4 00
3 50	25 42.6	112.8	26 34.2	112.2	27 25.5	111.6	28 16.9	111.1	29 08.0	110.5	3 50
40	26 57.3	115.2	27 49.2	114.6	28 40.8	114.0	29 32.4	113.5	30 23.9	112.9	40
30	28 10.5	117.6	29 02.6	117.0	29 54.8	116.4	30 46.7	115.9	31 38.5	115.3	30
20	29 22.0	120.1	30 14.6	119.5	31 07.1	118.9	31 59.4	118.4	32 51.5	117.8	20
10	30 31.8	122.6	31 24.8	122.0	32 17.7	121.4	33 10.4	120.9	34 03.0	120.3	10
3 00	31 39.7	125.1	32 33.2	124.6	33 26.5	124.0	34 19.7	123.5	35 12.7	122.9	3 00
2 50	32 45.4	127.7	33 39.3	127.2	34 33.1	126.6	35 26.7	126.1	36 20.1	125.5	2 50
40	33 48.9	130.4	34 43.3	129.9	35 37.5	129.3	36 31.5	128.8	37 25.4	128.2	40
30	34 49.8	133.1	35 44.7	132.6	36 39.4	132.1	37 34.0	131.5	38 28.4	131.0	30
20	35 48.2	135.8	36 43.5	135.4	37 38.7	134.9	38 33.8	134.4	39 28.7	133.9	20
10	36 43.6	138.7	37 39.5	138.2	38 35.0	137.8	39 30.6	137.3	40 26.1	136.8	10
2 00	37 36.0	141.6	38 32.3	141.1	39 28.5	140.7	40 24.6	140.2	41 20.5	139.7	2 00
1 50	38 25.1	144.5	39 21.9	144.1	40 18.5	143.7	41 15.1	143.2	42 11.7	142.8	1 50
40	39 10.8	147.5	40 08.0	147.1	41 05.2	146.7	42 02.3	146.3	42 59.3	145.9	40
30	39 52.7	150.6	40 50.5	150.2	41 48.1	149.9	42 45.8	149.5	43 43.1	149.1	30
20	40 31.0	153.7	41 29.1	153.4	42 27.2	153.1	43 25.2	152.7	44 23.2	152.3	20
10	41 05.1	156.9	42 03.6	156.6	43 02.1	156.3	44 00.6	156.0	44 59.0	155.6	10
1 00	41 35.1	160.1	42 34.0	159.8	43 32.8	159.6	44 31.6	159.3	45 30.4	159.0	1 00
0 50	42 00.7	163.3	42 59.9	163.1	43 59.2	162.9	44 58.3	162.7	45 57.5	162.4	0 50
40	42 21.9	166.6	43 21.4	166.4	44 20.8	166.3	45 20.3	166.1	46 19.8	165.9	40
30	42 38.5	169.9	43 38.2	169.8	44 37.9	169.7	45 37.6	169.5	46 37.3	169.4	30
20	42 50.4	173.3	43 50.3	173.2	44 50.2	173.1	45 50.1	173.0	46 49.9	172.9	20
10	42 57.5	176.6	43 57.5	176.5	44 57.5	176.5	45 57.5	176.5	46 57.5	176.4	10
0 00	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00							0 00.6	55.4	0 53.5	55.0	8 00
7 50					0 16.1	58.0	1 08.7	57.6	2 01.2	57.1	7 50
40			0 34.1	60.6	1 26.2	60.2	2 18.5	59.6	3 10.6	59.1	40
30	0 54.1	63.2	1 46.0	62.7	2 37.8	62.2	3 29.6	61.6	4 21.4	61.1	30
20	2 07.7	65.3	2 59.2	64.8	3 50.7	64.3	4 42.3	63.7	5 33.7	63.2	20
10	3 22.5	67.3	4 13.7	66.8	5 04.8	66.3	5 56.1	65.7	6 47.3	65.3	10
7 00	4 38.4	69.4	5 29.4	68.9	6 20.3	68.3	7 11.2	67.8	8 02.1	67.3	7 00
6 50	5 55.4	71.5	6 46.1	70.9	7 36.7	70.4	8 27.3	69.8	9 18.0	69.3	6 50
40	7 13.3	73.5	8 03.8	73.0	8 54.2	72.4	9 44.6	71.9	10 34.8	71.3	40
30	8 32.1	75.5	9 22.3	75.0	10 12.4	74.4	11 02.6	73.9	11 52.7	73.3	30
20	9 51.5	77.6	10 41.6	77.0	11 31.6	76.5	12 21.5	75.9	13 11.3	75.3	20
10	11 11.6	79.7	12 01.4	79.0	12 51.1	78.5	12 41.0	77.9	14 30.7	77.4	10
6 00	12 32.2	81.7	13 21.9	81.1	14 11.6	80.6	15 01.2	80.0	15 50.8	79.4	6 00
5 50	13 53.1	83.7	14 42.8	83.1	15 32.4	82.6	16 21.9	82.0	17 11.3	81.4	5 50
40	15 14.6	85.8	16 04.2	85.2	16 53.7	84.7	17 43.0	84.1	18 32.3	83.4	40
30	16 36.1	87.9	17 25.6	87.3	18 15.1	86.7	19 04.3	86.1	19 54.4	85.5	30
20	17 57.8	90.0	18 47.3	89.4	19 36.6	88.8	20 26.0	88.2	21 15.2	87.6	20
10	19 19.5	92.1	20 09.0	91.5	20 58.4	90.9	21 47.6	90.3	22 36.7	89.7	10
5 00	20 41.2	94.2	21 30.7	93.6	22 20.1	93.0	23 09.4	92.4	23 58.5	91.8	5 00
4 50	22 02.4	96.3	22 51.8	95.7	23 41.5	95.1	24 30.7	94.5	25 20.2	93.9	4 50
40	23 23.4	98.5	24 13.1	97.9	25 02.7	97.3	25 52.2	96.7	26 41.5	96.0	40
30	24 43.9	100.7	25 33.8	100.1	26 23.5	99.5	27 13.1	98.9	28 02.5	98.2	30
20	26 03.8	103.0	26 54.0	102.4	27 43.8	101.7	28 33.6	101.1	29 23.1	100.4	20
10	27 23.1	105.2	28 13.6	104.6	29 03.4	104.0	29 53.3	103.3	30 43.2	102.7	10
4 00	28 41.5	107.5	29 32.0	106.9	30 22.4	106.3	31 12.5	105.6	32 02.5	105.0	4 00
3 50	29 59.0	109.9	30 49.7	109.2	31 40.2	108.6	32 40.8	108.0	33 20.9	107.3	3 50
40	31 15.2	112.3	32 06.2	111.6	32 57.1	111.0	33 47.9	110.4	34 38.5	109.7	40
30	32 30.1	114.7	33 21.4	114.1	34 12.8	113.4	35 03.8	112.8	35 54.7	112.2	30
20	33 43.6	117.1	34 35.3	116.6	35 27.0	115.9	36 18.4	115.3	37 09.7	114.7	20
10	34 55.4	119.7	35 47.6	119.1	36 39.7	118.5	37 31.6	117.9	38 23.2	117.2	10
3 00	36 05.5	122.3	36 58.1	121.7	37 50.5	121.1	38 42.9	120.5	39 35.0	119.8	3 00
2 50	37 13.5	125.0	38 06.5	124.4	38 59.5	123.8	39 52.1	123.2	40 44.9	122.5	2 50
40	38 19.2	127.7	39 12.8	127.1	40 06.2	126.5	40 59.5	125.9	41 52.6	125.3	40
30	39 22.7	130.5	40 16.8	129.9	41 10.7	129.3	42 04.4	128.7	42 58.1	128.1	30
20	40 23.5	133.3	41 18.1	132.8	42 12.6	132.2	43 07.0	131.6	44 01.1	131.0	20
10	41 21.5	136.3	42 16.7	135.8	43 11.4	135.2	44 06.5	134.6	45 01.3	134.0	10
2 00	42 16.4	139.3	43 12.1	138.8	44 07.7	138.2	45 03.1	137.7	45 58.4	137.1	2 00
1 50	43 08.0	142.3	44 04.2	141.8	45 00.4	141.3	45 56.4	140.8	46 52.4	140.3	1 50
40	43 56.2	145.5	44 52.9	145.0	45 49.6	144.6	46 46.2	144.1	47 42.7	143.6	40
30	44 40.5	148.7	45 37.9	148.3	46 35.1	147.9	47 32.2	147.4	48 29.2	146.9	30
20	45 21.1	152.0	46 18.9	151.6	47 16.6	151.2	48 14.3	150.8	49 11.9	150.3	20
10	45 57.2	155.3	46 55.5	154.9	47 53.8	154.6	48 51.9	154.2	49 50.0	153.8	10
1 00	46 29.2	158.7	47 27.9	158.4	48 26.6	158.1	49 25.2	157.8	50 23.8	157.4	1 00
0 50	46 56.5	162.2	47 55.7	161.9	48 54.7	161.7	49 53.7	161.4	50 52.7	161.1	0 50
40	47 19.2	165.7	48 18.6	165.5	49 18.0	165.3	50 17.3	165.0	51 16.7	164.8	40
30	47 36.9	169.2	48 36.6	169.1	49 36.2	168.9	50 35.9	168.7	51 35.5	168.5	30
20	47 49.8	172.8	48 49.6	172.7	49 49.4	172.6	50 49.3	172.4	51 49.1	172.3	20
10	47 57.4	176.4	48 57.4	176.3	49 57.4	176.3	50 57.2	176.2	51 57.4	176.1	10
0 00	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	1 46.4	54.5	2 39.3	54.0	3 32.2	53.6	4 25.1	53.1	5 17.9	52.6	8 00
7 50	2 53.7	56.5	3 46.3	56.1	4 38.7	55.6	5 31.2	55.1	6 23.7	54.6	7 50
40	4 02.8	58.6	4 54.9	58.1	5 47.0	57.6	6 39.1	57.1	7 31.1	56.6	40
30	5 13.2	60.6	6 05.0	60.1	6 56.7	59.6	7 48.4	59.1	8 40.1	58.6	30
20	6 25.2	62.7	7 16.6	62.2	8 07.9	61.7	8 59.3	61.1	9 50.6	60.6	20
10	7 38.4	64.7	8 29.4	64.2	9 20.5	63.7	10 11.5	63.1	11 02.4	62.6	10
7 00	8 52.8	66.7	9 43.6	66.2	10 34.3	65.7	11 24.9	65.1	12 15.6	64.6	7 00
6 50	10 08.4	68.7	10 59.0	68.2	11 49.3	67.6	12 39.7	67.1	13 30.0	66.5	6 50
40	11 25.1	70.8	12 15.3	70.2	13 05.4	69.6	13 55.5	69.1	14 45.4	68.5	40
30	12 42.6	72.8	13 32.6	72.2	14 22.5	71.6	15 12.2	71.0	16 01.9	70.5	30
20	14 01.1	74.8	14 50.8	74.2	15 40.4	73.6	16 29.9	73.0	17 19.4	72.4	20
10	15 20.4	76.8	16 09.8	76.2	16 59.2	75.6	17 48.5	75.0	18 37.8	74.4	10
6 00	16 40.2	78.8	17 29.5	78.2	18 18.7	77.6	19 07.8	77.0	19 56.7	76.4	6 00
5 50	18 00.5	80.8	18 49.7	80.2	19 38.8	79.6	20 27.7	79.0	21 16.5	78.4	5 50
40	19 21.4	82.8	20 10.5	82.2	20 59.4	81.6	21 48.2	81.0	22 36.8	80.4	40
30	20 42.5	84.8	21 31.5	84.2	22 20.3	83.6	23 08.9	83.0	23 57.5	82.4	30
20	22 04.1	86.9	22 53.0	86.3	23 41.7	85.7	24 30.2	85.0	25 18.7	84.4	20
10	23 25.7	89.0	24 14.6	88.4	25 03.2	87.7	25 51.7	87.1	26 40.1	86.4	10
5 00	24 47.5	91.1	25 36.4	90.5	26 25.0	89.8	27 13.5	89.2	28 01.7	88.5	5 00
4 50	26 09.1	93.2	26 57.9	92.6	27 46.6	91.9	28 35.1	91.3	29 23.3	90.6	4 50
40	27 30.6	95.4	28 19.5	94.7	29 08.2	94.1	29 56.7	93.4	30 45.0	92.7	40
30	28 51.7	97.6	29 40.7	96.9	30 29.5	96.2	31 18.2	95.6	32 06.5	94.9	30
20	30 12.4	99.8	31 01.7	99.1	31 50.6	98.4	32 39.3	97.8	33 27.8	97.1	20
10	31 32.7	102.0	32 22.0	101.4	33 10.8	100.7	33 59.9	100.0	34 48.7	99.3	10
4 00	32 52.3	104.3	33 41.8	103.6	34 31.1	103.0	35 20.3	102.3	36 9.1	101.6	4 00
3 50	34 10.9	106.7	35 00.7	106.0	35 50.3	105.3	36 39.6	104.6	37 28.7	103.9	3 50
40	35 28.8	109.1	36 18.8	108.4	37 08.7	107.7	37 58.3	107.0	38 47.6	106.2	40
30	36 45.3	111.5	37 35.8	110.8	38 25.9	110.1	39 15.8	109.4	40 05.5	108.7	30
20	38 00.7	114.0	38 51.5	113.3	39 42.0	112.6	40 32.3	111.9	41 22.4	111.2	20
10	39 14.5	116.6	40 05.7	115.9	40 56.7	115.2	41 47.4	114.5	42 37.8	113.8	10
3 00	40 26.8	119.2	41 18.4	118.5	42 09.9	117.8	43 01.0	117.1	43 51.9	116.4	3 00
2 50	41 37.2	121.9	42 29.2	121.2	43 21.2	120.5	44 12.7	119.8	45 04.2	119.1	2 50
40	42 45.5	124.6	43 38.1	124.0	44 30.5	123.3	45 22.7	122.6	46 14.6	121.9	40
30	43 51.5	127.5	44 44.7	126.9	45 37.6	126.2	46 30.2	125.5	47 22.7	124.8	30
20	44 55.1	130.4	45 48.8	129.8	46 42.3	129.1	47 35.7	128.5	48 28.7	127.8	20
10	45 55.8	133.5	46 50.2	132.8	47 44.2	132.2	48 38.1	131.5	49 31.9	130.9	10
2 00	46 53.5	136.6	47 48.5	136.0	48 43.3	135.4	49 37.9	134.7	50 32.2	134.1	2 00
1 50	47 48.1	139.8	48 43.5	139.2	49 39.0	138.6	50 34.1	138.0	51 29.2	137.4	1 50
40	48 39.0	143.1	49 35.2	142.5	50 31.3	142.0	51 27.1	141.4	52 22.8	140.8	40
30	49 26.2	146.4	50 23.0	145.9	51 19.6	145.4	52 16.1	144.9	53 12.4	144.3	30
20	50 09.3	149.9	51 06.7	149.4	52 03.9	149.0	53 01.1	148.5	53 58.0	148.0	20
10	50 48.1	153.5	51 46.0	153.0	52 43.7	152.6	53 41.5	152.1	54 39.1	151.7	10
1 00	51 22.3	157.1	52 20.6	156.7	53 19.0	156.3	54 17.4	155.9	55 15.5	155.5	1 00
0 50	51 51.6	160.8	52 50.5	160.5	53 49.2	160.1	54 48.1	159.8	55 46.7	159.5	0 50
40	52 16.0	164.5	53 15.3	164.3	54 14.6	164.0	55 13.8	163.7	56 12.9	163.4	40
30	52 35.1	168.3	53 34.6	168.1	54 34.2	167.9	55 33.9	167.7	56 33.4	167.5	30
20	52 49.0	172.2	53 48.8	172.1	54 48.5	171.9	55 48.3	171.8	56 48.1	171.7	20
10	52 57.2	176.1	53 57.2	176.0	54 57.1	175.9	55 57.1	175.9	56 57.0	175.8	10
0 00	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 21.7	92.1	0 31.3	92.6							5 50
40	2 43.2	94.2	1 52.8	94.7	1 02.4	95.3	0 12.1	95.8			40
30	4 04.6	96.3	3 14.1	96.8	2 23.6	97.4	1 33.2	97.8	0 42.6	98.5	30
20	5 25.6	98.4	4 35.0	98.9	3 44.4	99.5	2 53.9	100.0	2 03.2	100.6	20
10	6 46.2	100.5	5 55.6	101.0	5 04.8	101.6	4 14.1	102.1	3 23.2	102.7	10
5 00	8 06.2	102.7	7 15.4	103.2	6 24.5	103.7	5 33.5	104.2	4 42.6	104.8	5 00
4 50	9 25.6	104.8	8 34.6	105.3	7 43.4	105.8	6 52.3	106.3	6 01.1	106.9	4 50
40	10 44.1	107.0	9 52.9	107.5	9 01.6	108.0	8 10.3	108.5	7 18.9	109.1	40
30	12 01.8	109.2	11 10.3	109.7	10 18.8	110.2	9 27.2	110.7	8 35.5	111.2	30
20	13 18.5	111.4	12 26.7	111.9	11 34.9	112.4	10 43.0	112.9	9 51.1	113.4	20
10	14 33.9	113.6	13 41.9	114.1	12 49.8	114.6	11 57.7	115.1	11 05.4	115.6	10
4 00	15 48.1	115.8	14 55.9	116.3	14 03.5	116.9	13 11.1	117.4	12 18.5	117.9	4 00
3 50	17 00.9	118.1	16 08.3	118.6	15 15.5	119.1	14 22.8	119.6	13 29.8	120.1	3 50
40	18 12.2	120.4	17 19.2	120.9	16 26.1	121.4	15 33.0	121.9	14 39.8	122.4	40
30	19 21.8	122.7	18 28.4	123.2	17 34.9	123.7	16 41.4	124.2	15 47.8	124.7	30
20	20 29.6	125.1	19 35.8	125.6	18 42.0	126.1	17 48.0	126.5	16 54.1	127.0	20
10	21 35.4	127.5	20 41.2	128.0	19 47.0	128.5	18 52.7	128.9	17 58.3	129.4	10
3 00	22 39.1	130.0	21 44.5	130.4	20 49.9	130.9	19 55.2	131.3	19 00.4	131.8	3 00
2 50	23 40.5	132.5	22 45.5	132.9	21 50.5	133.3	20 55.3	133.7	20 00.2	134.2	2 50
40	24 39.5	135.0	23 44.1	135.4	22 48.6	135.8	21 53.1	136.2	20 57.5	136.6	40
30	25 36.0	137.6	24 40.2	138.0	23 44.3	138.3	22 48.4	138.7	21 52.2	139.1	30
20	26 29.8	140.2	25 33.5	140.5	24 37.2	140.9	23 40.8	141.3	22 44.4	141.7	20
10	27 20.6	142.8	26 24.0	143.1	25 27.3	143.5	24 30.5	143.9	23 33.7	144.2	10
2 00	28 08.6	145.5	27 11.5	145.8	26 14.3	146.2	25 17.1	146.5	24 19.9	146.8	2 00
1 50	28 53.3	148.2	27 55.8	148.5	26 58.2	148.8	26 00.7	149.1	25 03.1	149.4	1 50
40	29 34.7	150.9	28 36.8	151.2	27 38.9	151.5	26 40.9	151.8	25 43.0	152.1	40
30	30 12.6	153.7	29 14.4	154.0	28 16.2	154.2	27 17.8	154.5	26 19.4	154.8	30
20	30 47.0	156.5	29 48.4	156.8	28 49.8	157.0	27 51.1	157.3	26 52.4	157.5	20
10	31 17.6	159.4	30 18.8	159.6	29 19.9	159.8	28 20.8	160.0	27 21.9	160.2	10
1 00	31 44.5	162.3	30 45.3	162.5	29 46.1	162.7	28 46.9	162.9	27 47.6	163.0	1 00
0 50	32 07.3	165.2	31 07.9	165.4	30 08.5	165.5	29 09.1	165.7	28 09.6	165.8	0 50
40	32 26.2	168.1	31 26.6	168.3	30 27.0	168.4	29 27.3	168.5	28 27.7	186.6	40
30	32 40.9	171.0	31 41.2	171.2	30 41.3	171.3	29 41.5	171.4	28 41.8	171.4	30
20	32 51.5	174.0	31 51.6	174.1	30 51.7	174.2	29 51.7	174.2	28 51.8	174.3	20
10	32 57.9	177.0	31 57.9	177.0	30 57.9	177.1	29 57.9	177.1	28 57.9	177.1	10
0 00	33 0.0	180.0	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 12.6	101.1	0 22.0	101.6							5 20
10	2 32.6	103.2	1 41.8	103.7	0 50.9	104.3	0 00.1	104.8			10
5 00	3 51.6	105.3	3 00.6	105.9	2 09.7	106.4	1 18.7	106.9	0 27.7	107.4	5 00
4 50	5 10.1	107.4	4 18.8	108.0	3 27.6	108.5	2 36.4	109.0	1 45.1	109.5	4 50
40	6 27.5	109.6	5 36.0	110.1	4 44.6	110.6	3 53.1	111.1	3 01.6	111.6	40
30	7 43.9	111.7	6 52.2	112.2	6 00.5	112.7	5 08.7	113.2	4 16.9	113.7	30
20	8 59.2	113.9	8 07.2	114.4	7 15.2	114.9	6 23.1	115.4	5 31.1	115.9	20
10	10 13.2	116.1	9 20.9	116.6	8 28.6	117.1	7 36.2	117.6	6 43.9	118.1	10
4 00	11 25.9	118.3	10 33.3	118.8	9 40.7	119.3	8 47.9	119.8	7 55.2	120.3	4 00
3 50	12 37.1	120.5	11 44.0	121.0	10 51.1	121.5	9 57.9	122.0	9 04.9	122.5	3 50
40	13 46.5	122.8	12 53.2	123.3	11 59.8	123.8	11 06.4	124.3	10 13.0	124.7	40
30	14 54.2	125.1	14 00.6	125.6	13 06.8	126.1	12 13.1	126.5	11 19.1	126.9	30
20	16 00.1	127.4	15 06.0	127.9	14 11.9	128.4	13 17.8	128.8	12 23.5	129.2	20
10	17 03.9	129.8	16 09.4	130.2	15 14.9	130.7	14 20.4	131.1	13 25.6	131.5	10
3 00	18 05.6	132.2	17 10.7	132.6	16 15.8	133.0	15 20.8	133.4	14 25.8	133.8	3 00
2 50	19 04.9	134.6	18 09.7	135.0	17 14.4	135.4	16 18.9	135.8	15 23.5	136.2	2 50
40	20 01.9	137.0	19 06.2	137.4	18 10.4	137.8	17 14.6	138.2	16 18.8	138.6	40
30	20 56.3	139.5	20 00.2	139.9	19 04.1	140.3	18 07.8	140.6	17 11.6	141.0	30
20	21 47.9	142.0	20 51.4	142.4	19 54.9	142.8	18 58.3	143.1	18 01.6	143.4	20
10	22 36.8	144.5	21 39.9	144.9	20 42.9	145.3	19 45.9	145.6	18 48.9	145.9	10
2 00	23 22.7	147.1	22 25.4	147.5	21 28.0	147.8	20 30.6	148.1	19 33.1	148.4	2 00
1 50	24 05.4	149.7	23 07.8	150.1	12 10.0	150.3	21 12.2	150.6	20 14.4	150.9	1 50
40	24 44.9	152.4	23 46.9	152.7	22 48.8	152.9	21 50.7	153.2	20 52.5	153.5	40
30	25 21.1	155.1	24 22.8	155.3	23 24.3	155.5	22 25.8	155.8	21 27.4	156.1	30
20	25 53.8	157.8	24 55.1	158.0	23 56.4	158.2	22 57.7	158.4	21 58.9	158.7	20
10	26 23.0	160.5	25 23.9	160.7	24 25.0	160.9	23 25.9	161.0	22 26.8	161.3	10
1 00	26 48.4	163.2	25 49.1	163.4	24 49.9	163.6	23 50.6	163.7	22 51.3	163.9	1 00
0 50	27 10.2	166.0	26 10.7	166.1	25 11.2	166.3	24 11.6	166.4	23 12.2	166.6	0 50
40	27 28.0	168.8	26 28.4	168.9	25 28.7	169.0	24 29.0	169.1	23 29.4	169.2	40
30	27 42.0	171.5	26 42.2	171.6	25 42.3	171.7	24 42.5	171.8	23 42.7	171.9	30
20	27 51.9	174.3	26 52.1	174.4	25 52.2	174.5	24 52.3	174.5	23 52.4	174.6	20
10	27 58.0	177.2	26 58.0	177.2	25 58.1	177.2	24 58.0	177.2	23 58.1	177.3	10
0 00	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 53.9	110.1	0 02.5	110.6							4 50
40	2 10.1	112.2	1 18.5	112.7	0 27.0	113.2					40
30	3 25.1	114.3	2 33.2	114.8	1 41.4	115.3	0 49.6	115.8			30
20	4 39.0	116.4	3 46.8	116.9	2 54.7	117.4	2 02.5	117.9	1 10.4	118.4	20
10	5 51.4	118.6	4 58.9	119.1	4 06.4	119.5	3 13.9	120.0	2 21.4	120.5	10
4 00	7 02.3	120.8	6 09.5	121.2	5 16.7	121.7	4 23.9	122.2	3 31.0	122.7	4 00
3 50	8 11.8	123.0	7 18.5	123.4	6 25.3	123.9	5 02.1	124.4	4 38.9	124.8	3 50
40	9 19.5	125.2	8 25.9	125.6	7 32.3	126.1	6 38.7	126.5	5 45.1	127.0	40
30	10 25.3	127.4	9 31.3	127.8	8 37.4	128.3	7 43.4	128.7	6 49.4	129.2	30
20	11 29.2	129.7	10 34.9	130.1	9 40.5	130.5	8 46.2	130.9	7 51.8	131.4	20
10	12 31.1	132.0	11 36.3	132.4	10 41.6	132.8	9 46.8	133.2	8 51.9	133.6	10
3 00	13 30.7	134.3	12 35.6	134.7	11 40.4	135.1	10 45.2	135.5	9 50.0	135.9	3 00
2 50	14 28.0	136.6	13 32.4	137.0	12 36.9	137.4	11 41.3	137.8	10 45.7	138.2	2 50
40	15 22.9	139.0	14 27.0	139.3	13 31.0	139.7	12 35.0	140.1	11 39.0	140.5	40
30	16 15.3	141.4	15 18.9	141.7	14 22.6	142.1	13 26.1	142.4	12 29.8	142.8	30
20	17 04.9	143.8	16 08.2	144.1	15 11.4	144.5	14 14.6	144.8	13 17.8	145.1	20
10	17 51.8	146.2	16 54.6	146.5	15 57.4	146.9	15 00.3	147.2	14 03.1	147.5	10
2 00	18 35.7	148.7	17 38.2	149.0	16 40.7	149.3	15 43.1	149.6	14 45.6	149.9	2 00
1 50	19 16.6	151.2	18 18.8	151.5	17 20.8	151.8	16 23.0	152.0	15 25.0	152.3	1 50
40	19 54.4	153.7	18 56.2	154.0	17 58.0	154.2	16 59.8	154.5	16 01.4	154.7	40
30	20 28.9	156.3	19 30.4	156.5	18 31.9	156.7	17 33.4	157.0	16 34.7	157.2	30
20	21 00.1	158.9	20 01.3	159.1	19 02.4	159.3	18 03.6	159.5	17 04.7	159.7	20
10	21 27.9	161.5	20 28.7	161.6	19 29.6	161.8	18 30.6	162.0	17 31.4	162.2	10
1 00	21 52.0	164.1	20 52.7	164.2	19 53.4	164.4	18 54.1	164.5	17 54.7	164.7	1 00
0 50	22 12.7	166.7	21 13.1	166.8	20 13.6	167.0	19 14.1	167.1	18 14.6	167.2	0 50
40	22 29.7	169.3	21 30.0	169.4	20 30.3	169.6	19 30.6	169.7	18 30.9	169.8	40
30	22 42.9	172.0	21 43.0	172.1	20 43.2	172.2	19 43.4	172.2	18 43.6	172.3	30
20	22 52.5	174.6	21 52.5	174.7	20 52.6	174.8	19 52.7	174.8	18 52.7	174.9	20
10	22 58.1	177.3	21 58.1	177.3	20 58.1	177.4	19 58.1	177.4	18 58.1	177.4	10
0 00	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 20	0 18.1	118.9									4 20
10	1 28.2	121.0	0 36.6	121.5							10
4 00	2 38.2	123.1	1 45.3	123.6	0 52.4	124.1	0 00.6	124.6			4 00
3 50	3 45.8	125.2	2 52.4	125.7	1 59.1	126.2	1 05.9	126.7	0 12.5	127.1	3 50
40	4 51.5	127.4	3 57.8	127.9	3 04.2	128.3	2 10.5	128.8	1 16.8	129.2	40
30	5 55.4	129.6	5 01.3	130.0	4 07.2	130.4	3 13.1	130.9	2 19.1	131.3	30
20	6 57.3	131.8	6 02.9	132.2	5 08.4	132.6	4 13.9	133.1	3 19.4	133.5	20
10	7 57.1	134.0	7 02.3	134.4	6 07.4	134.8	5 12.6	135.2	4 17.6	135.6	10
3 00	8 54.8	136.3	7 59.5	136.7	7 04.2	137.1	6 08.9	137.4	5 13.6	137.8	3 00
2 50	9 50.1	138.5	8 54.4	138.9	7 58.7	139.3	7 02.9	139.6	6 07.3	140.0	2 50
40	10 42.9	140.8	9 46.9	141.2	8 50.8	141.5	7 54.6	141.9	6 58.5	142.2	40
30	11 33.3	143.1	10 36.8	143.5	9 40.3	143.8	8 43.8	144.1	7 47.2	144.4	30
20	12 21.0	145.4	11 24.2	145.8	10 27.3	146.1	9 30.3	146.4	8 33.4	146.7	20
10	13 05.9	147.8	12 08.2	148.1	11 11.1	148.4	10 14.1	148.7	9 16.8	149.0	10
2 00	13 48.0	150.2	12 50.4	150.5	11 52.8	150.8	10 55.2	151.0	9 57.5	151.3	2 00
1 50	14 27.1	152.6	13 29.2	152.9	12 31.2	153.1	11 33.2	153.3	10 35.2	153.6	1 50
40	15 03.2	155.0	14 04.9	155.3	13 06.6	155.5	12 08.3	155.7	11 10.0	155.9	40
30	15 36.1	157.4	14 37.7	157.7	13 39.0	157.9	12 40.4	158.1	11 41.7	158.3	30
20	16 05.9	159.9	15 07.1	160.1	14 08.2	160.3	13 09.3	160.5	12 10.4	160.7	20
10	16 32.3	162.4	15 33.2	162.5	14 34.1	162.7	13 34.9	162.9	12 35.7	163.1	10
1 00	16 55.4	164.9	15 56.0	165.0	14 56.7	165.2	13 57.3	165.3	12 58.0	165.5	1 00
0 50	17 15.0	167.4	16 15.6	167.5	15 15.9	167.6	14 16.4	167.7	13 16.8	167.9	0 50
40	17 31.2	169.9	16 31.5	170.0	15 31.8	170.1	14 32.1	170.2	13 32.4	170.3	40
30	17 43.8	172.4	16 43.9	172.5	15 44.1	172.5	14 44.2	172.6	13 44.3	172.7	30
20	17 52.8	174.6	16 52.9	175.0	15 53.0	175.0	14 53.1	175.1	13 53.1	175.1	20
10	17 58.1	177.4	16 58.2	177.5	15 58.2	177.5	14 58.2	177.5	13 58.3	177.5	10
0 00	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	15 0.0	180.0	14 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 40	0 23.2	129.7									3 40
30	1 25.0	131.8	0 30.9	132.2							30
20	2 24.9	133.9	1 30.4	134.3	0 35.9	134.7					20
10	3 22.7	136.0	2 27.7	136.4	1 32.7	136.8	0 37.8	137.3			10
3 00	4 18.3	138.2	3 22.9	138.6	2 27.6	139.0	1 32.2	139.4	0 36.9	139.8	3 00
2 50	5 11.6	140.4	4 15.7	140.8	3 20.0	141.1	2 24.2	141.5	1 28.4	141.9	2 50
40	6 02.4	142.6	5 06.2	143.0	4 10.0	143.3	3 13.9	143.7	2 17.7	144.0	40
30	6 50.7	144.8	5 54.2	145.2	4 57.5	145.5	4 00.9	145.8	3 04.4	146.2	30
20	7 36.5	147.1	6 39.6	147.4	5 42.6	147.7	4 45.6	148.0	3 48.6	148.4	20
10	8 19.6	149.3	7 22.2	149.6	6 24.8	149.9	5 27.5	150.2	4 30.2	150.5	10
2 00	8 59.8	151.6	8 02.2	151.9	7 04.5	152.2	6 06.8	152.4	5 09.1	152.7	2 00
1 50	9 37.3	153.9	8 39.2	154.2	7 41.2	154.4	6 43.1	154.6	5 45.1	154.9	1 50
40	10 11.7	156.2	9 13.4	156.4	8 15.0	156.7	7 16.7	156.9	6 18.3	157.2	40
30	10 43.2	158.5	9 44.6	158.7	8 45.8	159.0	7 47.2	159.2	6 48.6	159.4	30
20	11 11.5	160.9	10 12.6	161.1	9 13.7	161.3	8 14.8	161.5	7 15.8	161.6	20
10	11 36.7	163.2	10 37.6	163.4	9 38.2	163.6	8 39.2	163.8	7 40.1	163.9	10
1 00	11 58.7	165.7	10 59.3	165.8	9 59.9	165.9	9 00.5	166.1	8 01.1	166.2	1 00
0 50	12 17.2	168.0	11 17.7	168.1	10 18.1	168.2	9 18.6	168.4	8 19.0	168.5	0 50
40	12 32.6	170.4	11 32.9	170.5	10 33.2	170.6	9 33.5	170.7	8 33.8	170.8	40
30	12 44.6	172.8	11 44.7	172.8	10 44.8	172.9	9 45.1	173.0	8 45.2	173.1	30
20	12 53.2	175.2	11 53.3	175.2	10 53.3	175.3	9 53.4	175.3	8 53.4	175.4	20
10	12 58.3	177.6	11 58.3	177.6	10 58.3	177.6	9 58.3	177.6	8 58.3	177.7	10
0 00	13 0.0	180.0	12 0.0	180.0	11 0.0	180.0	10 0.0	180.0	9 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20									0 45.0	83.6	6 20
10					0 22.3	86.8	1 13.3	86.3	2 04.1	85.7	10
6 00	0 00.0	90.0	0 50.9	89.5	1 41.8	88.9	2 32.6	88.4	3 23.5	87.9	6 00
5 50	1 19.5	92.1	2 10.2	91.6	3 01.2	91.0	3 52.2	90.5	4 42.9	90.0	5 50
40	2 38.8	94.2	3 29.7	93.7	4 20.7	93.2	5 11.5	92.7	6 02.4	92.1	40
30	3 58.0	96.4	4 49.0	95.8	5 39.9	95.3	6 30.9	94.8	7 21.8	94.2	30
20	5 16.8	98.5	6 07.9	98.0	6 59.0	97.4	7 50.0	96.9	8 41.0	96.4	20
10	6 35.2	100.6	7 26.4	100.1	8 17.5	99.6	9 08.8	99.1	9 59.8	98.5	10
5 00	7 53.0	102.8	8 44.3	102.3	9 35.6	101.8	10 26.9	101.2	11 18.1	100.7	5 00
4 50	9 10.2	105.0	10 01.7	104.5	10 53.2	103.9	11 44.6	103.4	12 35.9	102.9	4 50
40	10 26.5	107.2	11 18.2	106.6	12 09.9	106.1	13 01.6	105.6	13 53.1	105.1	40
30	11 42.0	109.4	12 33.9	108.8	13 25.8	108.3	14 17.7	107.8	15 09.3	107.3	30
20	12 56.5	111.6	13 48.7	111.1	14 40.8	110.6	15 32.9	110.1	16 24.9	109.5	20
10	14 09.8	113.8	15 02.2	113.4	15 54.7	112.8	16 46.9	112.3	17 39.1	111.8	10
4 00	15 21.9	116.1	16 14.6	115.6	17 07.3	115.1	17 59.9	114.6	18 52.4	114.1	4 00
3 50	16 32.6	118.4	17 25.7	117.9	18 18.5	117.4	19 11.5	116.9	20 04.2	116.4	3 50
40	17 41.7	120.7	18 35.1	120.2	19 28.4	119.8	20 21.6	119.3	21 14.7	118.8	40
30	18 49.2	123.0	19 42.9	122.6	20 36.6	122.1	21 30.2	121.6	22 23.6	121.2	30
20	19 54.9	125.4	20 49.0	125.0	21 43.0	124.5	22 37.0	124.0	23 30.8	123.6	20
10	20 58.7	127.8	21 53.2	127.4	22 47.6	126.9	23 41.8	126.5	24 36.0	126.0	10
3 00	22 00.4	130.3	22 55.2	129.9	23 50.0	129.4	24 44.7	129.0	25 39.3	128.5	3 00
2 50	22 59.8	132.8	23 55.1	132.4	24 50.3	131.9	25 45.3	131.5	26 40.4	131.0	2 50
40	23 57.0	135.3	24 52.6	134.6	25 48.2	134.5	26 43.7	134.1	27 39.1	133.6	40
30	24 51.6	137.9	25 47.8	137.5	26 43.7	137.1	27 39.6	136.7	28 35.4	136.2	30
20	25 43.6	140.5	26 40.0	140.1	27 36.4	139.7	28 32.8	139.3	29 29.0	138.9	20
10	26 32.8	143.1	27 29.7	142.7	28 26.5	142.4	29 23.3	142.0	30 19.8	141.6	10
2 00	27 19.1	145.8	28 16.4	145.4	29 13.6	145.1	30 10.7	244.7	31 07.8	144.4	2 00
1 50	28 02.2	148.5	28 59.9	148.1	29 57.5	147.8	30 54.9	147.5	31 52.4	147.2	1 50
40	28 42.1	151.2	29 40.1	150.9	30 38.1	150.6	31 36.0	150.3	32 33.9	150.0	40
30	29 18.7	154.0	30 17.1	153.7	31 15.5	153.4	32 13.8	153.2	33 11.9	152.9	30
20	29 51.9	156.8	30 50.6	156.5	31 49.2	156.3	32 47.8	156.1	33 46.4	155.8	20
10	30 21.9	159.6	31 20.4	159.4	32 19.4	159.2	33 18.2	159.0	34 17.1	158.7	10
1 00	30 47.3	162.5	31 46.5	162.3	32 45.6	162.1	33 44.8	161.9	34 43.9	161.7	1 00
0 50	31 09.3	165.4	32 08.8	165.2	33 08.2	165.0	34 07.7	164.9	35 07.0	164.7	0 50
40	31 27.5	168.3	32 27.1	168.1	33 26.8	168.0	34 26.4	167.9	35 26.0	167.7	40
30	31 41.7	171.2	32 41.4	171.1	33 41.2	171.0	34 41.1	170.9	35 40.7	170.8	30
20	31 51.8	174.1	32 51.7	174.0	33 51.6	174.0	34 51.5	173.9	35 51.4	173.9	20
10	31 58.0	177.0	32 57.9	177.0	33 57.9	177.0	34 57.9	177.0	35 57.8	176.9	10
0 00	32 0.0	180.0	33 0.0	180.0	34 0.0	180.0	35 0.0	180.0	36 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 50							0 15.3	75.2	1 06.6	74.7	6 50
40					0 41.3	77.8	1 32.5	77.3	2 23.9	76.8	40
30	0 17.2	81.0	1 08.2	80.5	1 59.3	79.9	2 50.4	79.4	3 41.3	78.9	30
20	1 35.9	83.1	2 26.9	82.6	3 17.8	82.1	4 08.6	81.5	4 59.6	81.0	20
10	2 55.1	85.2	3 45.9	84.7	4 36.8	84.2	5 27.6	83.6	6 18.4	83.1	10
6 00	4 14.3	87.3	5 05.2	86.8	5 55.9	86.3	6 46.7	85.7	7 37.4	85.2	6 00
5 50	5 33.8	89.5	6 24.6	88.9	7 15.4	88.4	8 06.0	87.8	8 56.7	87.3	5 50
40	6 53.2	91.6	7 44.0	91.1	8 34.8	90.5	9 25.5	90.0	10 16.2	89.4	40
30	8 12.7	93.7	9 03.4	93.2	9 54.3	92.6	10 45.0	92.1	11 35.6	91.5	30
20	9 31.9	95.9	10 22.8	95.3	11 13.6	94.8	12 4.4	94.2	12 55.1	93.7	20
10	10 50.8	98.0	11 41.9	97.4	12 32.7	96.9	13 23.5	96.3	14 14.3	95.8	10
5 00	12 09.3	100.2	13 00.3	99.6	13 51.4	99.1	14 42.3	98.5	15 33.2	98.0	5 00
4 50	13 27.2	102.3	14 18.4	101.8	15 09.6	101.3	16 00.6	100.7	16 51.7	100.2	4 50
40	14 44.6	104.5	15 36.0	104.0	16 27.3	103.5	17 18.5	102.9	18 09.7	102.4	40
30	16 01.1	106.7	16 52.6	106.2	17 44.2	105.7	18 35.6	105.1	19 26.9	104.6	30
20	17 16.8	109.0	18 08.6	108.5	19 00.3	107.9	19 51.9	107.4	20 43.4	106.8	20
10	18 31.4	111.3	19 23.4	110.8	20 15.4	110.2	21 07.2	109.7	21 59.2	109.1	10
4 00	19 44.8	113.6	20 37.1	113.1	21 29.4	112.5	22 21.5	112.0	23 13.5	111.4	4 00
3 50	20 57.0	115.9	21 49.7	115.4	22 42.2	114.8	23 34.6	114.3	24 26.9	113.8	3 50
40	22 07.8	118.3	23 00.8	117.7	23 53.6	117.2	24 46.4	116.7	25 39.0	116.2	40
30	23 17.0	120.7	24 10.3	120.1	25 03.5	119.6	25 56.5	119.1	26 49.5	118.6	30
20	24 24.6	123.1	25 18.2	122.6	26 11.8	122.1	27 05.2	121.6	27 58.5	121.1	20
10	25 30.2	125.5	26 24.2	125.1	27 18.2	124.6	28 11.9	124.1	29 05.8	123.6	10
3 00	26 33.8	128.0	27 28.3	127.6	28 22.7	127.1	29 16.9	126.6	30 11.0	126.1	3 00
2 50	27 35.4	130.6	28 30.2	130.1	29 24.9	129.7	30 19.5	129.2	31 14.2	128.7	2 50
40	28 34.5	133.2	29 29.7	132.7	30 24.9	132.3	31 20.0	131.8	32 15.0	131.4	40
30	29 31.2	135.8	30 26.9	135.4	31 22.4	135.0	32 17.9	134.5	33 13.4	134.1	30
20	30 25.2	138.5	31 21.3	138.1	32 17.4	137.7	33 13.3	137.2	34 09.2	136.8	20
10	31 16.5	141.2	32 13.0	140.8	33 09.5	140.4	34 05.8	140.0	35 02.2	139.6	10
2 00	32 04.8	144.0	33 01.7	143.6	33 58.6	143.3	34 55.4	142.9	35 52.1	142.5	2 00
1 50	32 49.9	146.8	33 47.2	146.5	34 44.5	146.1	35 41.7	145.7	36 39.0	145.4	1 50
40	33 31.7	149.7	34 29.5	149.4	35 27.2	149.0	36 24.9	148.7	37 22.5	148.3	40
30	34 10.2	152.6	35 08.2	152.3	36 06.3	152.0	37 04.3	151.7	38 02.5	151.3	30
20	34 45.0	155.5	35 43.5	155.2	36 42.0	155.0	37 40.4	154.7	38 38.8	154.4	20
10	35 16.0	158.5	36 14.9	158.2	37 13.6	158.0	38 12.4	157.7	39 11.2	157.5	10
1 00	35 43.1	161.5	36 42.3	161.3	37 41.4	161.1	38 40.5	160.8	39 39.6	160.6	1 00
0 50	36 06.4	164.5	37 05.8	164.3	38 05.2	164.1	39 04.5	163.9	40 03.9	163.8	0 50
40	36 25.6	167.6	37 25.2	167.4	38 24.8	167.3	39 24.4	167.1	40 24.0	167.0	40
30	36 40.6	170.7	37 40.4	170.5	38 40.2	170.4	39 39.8	170.3	40 39.6	170.2	30
20	36 51.3	173.8	37 51.2	173.7	38 51.1	173.6	39 51.0	173.6	40 50.9	173.5	20
10	36 57.8	176.9	39 57.8	176.8	38 57.8	176.8	39 57.7	176.8	40 57.7	176.7	10
0 00	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	41 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30									0 28.9	63.7	7 30
20							0 48.7	66.3	1 40.8	65.8	20
10			0 18.5	69.5	1 10.3	68.9	2 02.1	68.4	2 53.9	67.9	10
7 00	0 41.9	72.0	1 33.5	71.5	2 25.0	71.0	3 16.5	70.5	4 08.0	70.0	7 00
6 50	1 58.1	74.2	2 49.3	73.6	3 40.6	73.1	4 31.9	72.6	5 23.1	72.1	6 50
40	3 14.8	76.3	4 06.0	75.7	4 57.1	75.2	5 48.2	74.7	6 39.3	74.2	40
30	4 32.8	78.4	5 23.4	77.8	6 14.3	77.3	7 05.1	76.8	7 56.1	76.2	30
20	5 50.5	80.5	6 41.3	79.9	7 32.1	79.4	8 22.9	78.9	9 13.6	78.3	20
10	7 09.2	82.6	7 59.8	82.0	8 50.6	81.5	9 41.1	80.9	10 31.8	80.4	10
6 00	8 28.1	84.7	9 18.7	84.1	10 09.3	83.6	10 59.8	83.0	11 50.3	82.5	6 00
5 50	9 47.4	86.8	10 38.0	86.2	11 28.5	85.7	12 18.9	85.1	13 09.2	84.6	5 50
40	11 06.8	88.9	11 57.3	88.3	12 47.8	87.8	13 38.2	87.2	14 28.6	86.7	40
30	12 26.3	91.0	13 16.8	90.4	14 07.3	89.9	14 57.6	89.3	15 47.8	88.8	30
20	13 45.7	93.1	14 36.2	92.6	15 26.7	92.0	16 17.1	91.4	17 07.4	90.9	20
10	15 05.0	95.2	15 55.6	94.7	16 46.1	94.1	17 36.6	93.6	18 27.1	93.0	10
5 00	16 24.0	97.4	17 14.7	96.9	18 05.3	96.3	18 55.8	95.7	19 46.2	95.2	5 00
4 50	17 42.6	99.6	18 33.4	99.1	19 24.1	98.5	20 14.7	97.9	21 05.1	97.3	4 50
40	19 00.7	101.8	19 51.7	101.3	20 42.5	100.7	21 33.2	100.1	22 23.8	99.5	40
30	20 18.2	104.0	21 09.2	103.5	22 00.3	102.9	22 51.2	102.3	23 42.0	101.7	30
20	21 34.9	106.3	22 26.2	105.7	23 17.4	105.2	24 08.5	104.6	24 59.4	104.0	20
10	22 50.6	108.6	23 42.2	108.0	24 33.6	107.5	25 24.9	106.9	26 16.1	106.3	10
4 00	24 05.5	110.9	24 57.3	110.3	25 49.0	109.8	26 40.5	109.2	27 31.9	108.6	4 00
3 50	25 19.2	113.2	26 11.3	112.7	27 03.2	112.1	27 55.1	111.6	28 46.7	111.0	3 50
40	26 31.6	115.6	27 24.0	115.1	28 16.2	114.5	29 08.3	114.0	30 00.3	113.4	40
30	27 42.5	118.0	28 35.2	117.4	29 27.8	117.0	30 20.2	116.4	31 12.6	115.8	30
20	28 51.8	120.5	29 44.9	120.0	30 37.8	119.5	31 30.6	118.9	32 23.3	118.3	20
10	29 59.4	123.0	30 52.8	122.5	31 46.2	122.0	32 39.4	121.4	33 32.5	120.9	10
3 00	31 05.0	125.6	31 59.0	125.1	32 52.7	124.6	33 46.3	124.0	34 39.8	123.5	3 00
2 50	32 08.6	128.2	33 02.8	127.7	33 57.1	127.2	34 51.1	126.7	35 45.1	126.1	2 50
40	33 09.8	130.9	34 04.6	130.4	34 59.2	129.9	35 53.7	129.4	36 48.0	128.8	40
30	34 08.7	133.6	35 03.9	133.1	35 59.0	132.6	36 53.9	132.1	37 48.8	131.6	30
20	35 05.0	136.3	36 00.6	135.9	36 56.2	135.4	37 51.6	134.9	38 46.9	134.5	20
10	35 58.5	139.2	36 54.5	138.7	37 50.5	138.3	38 46.4	137.8	39 42.2	137.4	10
2 00	36 48.8	142.1	37 45.4	141.6	38 41.9	141.2	39 38.3	140.8	40 34.5	140.3	2 00
1 50	37 36.7	145.0	38 33.1	144.6	39 30.0	144.2	40 26.9	143.8	41 23.7	143.3	1 50
40	38 20.0	148.0	39 17.5	147.6	40 14.9	147.2	41 12.2	146.8	42 09.4	146.4	40
30	39 00.5	151.0	39 58.3	150.7	40 56.1	150.3	41 53.8	149.9	42 51.6	149.6	30
20	39 37.1	154.1	40 35.4	153.8	41 33.6	153.4	42 31.8	153.1	43 29.9	152.8	20
10	40 09.9	157.2	41 08.5	156.9	42 07.2	156.6	43 05.7	156.4	44 04.1	156.1	10
1 00	40 38.6	160.4	41 37.6	160.1	42 36.5	159.9	43 35.4	159.6	44 34.3	159.4	1 00
0 50	41 03.3	163.6	42 02.5	163.4	43 01.8	163.2	44 01.0	163.0	45 00.1	162.7	0 50
40	41 23.5	166.8	42 23.0	166.7	43 22.5	166.5	44 22.0	166.3	45 21.5	166.1	40
30	41 39.5	170.1	42 39.1	170.0	43 38.8	169.8	44 38.5	169.7	45 38.2	169.5	30
20	41 50.8	173.4	42 50.7	173.3	43 50.6	173.2	44 50.5	173.1	45 50.3	173.0	20
10	41 57.7	176.7	42 57.6	176.7	43 57.6	176.6	44 57.5	176.6	45 57.7	176.5	10
0 00	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	46 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00							0 34.6	55.5	1 27.9	55.0	8 00
7 50					0 47.9	58.1	1 40.9	57.6	2 33.8	57.1	7 50
40	0 10.9	61.1	1 03.5	60.6	1 56.1	60.2	2 48.8	59.7	3 41.4	59.2	40
30	1 21.1	63.2	2 13.4	62.7	3 05.8	62.2	3 58.1	61.7	4 50.3	61.3	30
20	2 32.8	65.3	3 24.8	64.8	4 16.8	64.3	5 08.8	63.8	6 00.7	63.3	20
10	3 45.7	67.4	4 37.3	66.9	5 28.9	66.4	6 20.6	65.8	7 12.3	65.3	10
7 00	4 59.5	69.5	5 51.0	69.0	6 42.4	68.5	7 33.8	67.9	8 25.2	67.4	7 00
6 50	6 14.4	71.6	7 05.7	71.0	7 56.8	70.5	8 47.9	69.9	9 39.1	69.4	6 50
40	7 30.3	73.6	8 21.3	73.1	9 12.3	72.6	10 03.2	72.0	10 54.0	71.5	40
30	8 46.9	75.7	9 37.7	75.1	10 28.4	74.6	11 19.2	74.0	12 09.8	73.5	30
20	10 04.3	77.8	10 54.9	77.2	11 45.5	76.7	12 36.0	76.1	13 26.4	75.6	20
10	11 22.3	79.8	12 12.7	79.3	13 03.1	78.7	13 53.5	78.1	14 43.7	77.6	10
6 00	12 40.7	81.9	13 31.0	81.4	14 21.3	80.8	15 11.5	80.2	16 01.7	79.7	6 00
5 50	13 59.7	84.0	14 49.9	83.4	15 39.9	82.9	16 30.1	82.3	17 20.0	81.7	5 50
40	15 18.8	86.1	16 09.0	85.5	16 59.1	85.0	17 49.1	84.4	18 38.9	83.8	40
30	16 38.1	88.2	17 28.4	87.6	18 18.3	87.0	19 08.2	86.5	19 58.0	85.9	30
20	17 56.6	90.3	18 47.7	89.7	19 37.7	89.1	20 27.6	88.6	21 17.5	88.0	20
10	19 16.9	92.4	20 07.2	91.8	20 57.2	91.2	21 46.9	90.7	22 36.9	90.1	10
5 00	20 36.5	94.6	21 26.6	94.0	22 16.7	93.4	23 06.6	92.8	23 56.4	92.2	5 00
4 50	21 55.6	96.8	22 45.8	96.2	23 35.9	95.6	24 25.9	95.0	25 16.0	94.4	4 50
40	23 14.3	99.0	24 04.6	98.4	24 54.9	97.8	25 45.0	97.2	26 34.9	96.5	40
30	24 32.7	101.2	25 23.1	100.6	26 13.4	100.0	27 03.6	99.4	27 53.7	98.7	30
20	25 50.2	103.4	26 40.8	102.8	27 31.3	102.2	28 21.7	101.6	29 11.9	101.0	20
10	27 07.2	105.7	27 58.0	105.1	28 48.8	104.5	29 39.4	103.9	30 29.7	103.3	10
4 00	28 23.1	108.0	29 14.2	107.4	30 05.2	106.8	30 56.0	106.2	31 46.7	105.6	4 00
3 50	29 38.2	110.4	30 29.7	109.8	31 20.8	109.2	32 11.9	108.6	33 02.7	107.9	3 50
40	30 52.2	112.8	31 43.8	112.2	32 35.3	111.6	33 26.7	111.0	34 17.9	110.4	40
30	32 05.8	115.3	32 56.8	114.7	33 48.6	114.1	34 40.2	113 5	35 31.7	112.8	30
20	33 15.9	117.8	34 08.2	117.2	35 00.4	116.6	35 52.4	116.0	36 44.3	115.3	20
10	34 25.4	120.3	35 18.1	119.7	36 10.7	119.1	37 03.1	118.6	37 55.4	117.9	10
3 00	35 33.1	122.9	36 26.2	122.3	37 19.2	121.7	38 12.1	121.2	39 04.8	120.5	3 00
2 50	36 38.8	125.6	37 32.4	125.0	38 25.8	124.5	39 19.1	123.9	40 12.2	123.2	2 50
40	37 42.2	128.3	38 36.3	127.8	39 30.2	127.2	40 24.0	126.6	41 17.6	126.0	40
30	38 43.5	131.1	39 38.0	130.6	40 32.4	130.0	41 26.7	129.4	42 20.7	128.8	30
20	39 42.1	133.9	40 37.1	133.4	41 32.0	132.9	42 26.8	132.3	43 21.4	131.8	20
10	40 37.9	136.9	41 33.4	136.4	42 28.9	135.8	43 24.1	135.3	44 19.2	134.8	10
2 00	41 30.7	139.8	42 26.7	139.4	43 22.7	138.9	44 18.5	138.4	45 14.2	137.8	2 00
1 50	42 20.4	142.9	43 16.9	142.5	44 13.3	142.0	45 09.8	141.5	46 05.9	141.0	1 50
40	43 06.5	146.0	44 03.5	145.6	45 00.5	145.1	45 57.4	144.7	46 54.2	144.2	40
30	43 49.1	149.2	44 46.7	148.8	45 44.1	148.4	46 41.5	147.9	47 38.7	147.5	30
20	44 27.9	152.4	45 25.9	152.1	46 23.8	151.7	47 21.7	151.3	48 19.5	150.9	20
10	45 02.7	155.7	46 01.1	155.4	46 59.4	155.1	47 57.8	154.7	48 56.0	154.4	10
1 00	45 33.2	159.1	46 32.0	158.8	47 30.8	158.5	48 29.6	158.2	49 28.3	157.9	1 00
0 50	45 59.4	162.5	46 58.7	162.2	47 57.7	162.0	48 56.8	161.7	49 55.8	161.5	0 50
40	46 21.0	165.9	47 20.4	165.7	48 19.9	165.5	49 19.3	165.3	50 18.7	165.1	40
30	46 38.0	169.4	47 37.7	169.2	48 37.2	169.1	49 37.0	168.9	50 36.7	168.8	30
20	46 50.2	172.9	47 50.0	172.8	48 49.9	172.7	49 49.8	172.6	50 49.6	172.5	20
10	46 57.7	176.5	47 57.5	176.4	48 57.4	176.4	49 57.4	176.3	50 57.4	176.3	10
0 00	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	51 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned fromSouth to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	2 21.2	54.5	3 14.5	54.1	4 07.8	53.6	5 01.1	53.1	5 54.3	52.7	8 00
7 50	3 26.8	56.6	4 19.7	56.1	5 12.7	55.6	6 05.5	55.2	6 58.5	54.7	7 50
40	4 34.0	58.7	5 26.6	58.2	6 19.1	57.7	7 11.6	57.2	8 04.1	56.7	40
30	5 42.6	60.7	6 34.8	60.2	7 27.0	59.7	8 19.1	59.3	9 11.3	58.8	30
20	6 52.6	62.8	7 44.5	62.3	8 36.3	61.8	9 28.2	61.3	10 19.9	60.8	20
10	8 03.9	64.8	8 55.6	64.3	9 47.0	63.8	10 38.6	63.3	11 30.0	62.8	10
7 00	9 16.5	66.9	10 07.8	66.4	10 59.0	65.8	11 50.1	65.3	12 41.2	64.8	7 00
6 50	10 30.1	68.9	11 21.1	68.4	12 12.1	67.8	13 02.9	67.3	13 53.7	66.8	6 50
40	11 44.8	70.9	12 35.5	70.4	13 26.2	69.9	14 16.8	69.3	15 07.3	68.8	40
30	13 00.4	72.9	13 50.8	72.4	14 41.2	71.9	15 31.7	71.3	16 21.9	70.7	30
20	14 16.8	75.0	15 07.1	74.4	15 57.2	73.9	16 47.3	73.3	17 37.3	72.7	20
10	15 33.9	77.0	16 24.0	76.5	17 14.0	75.9	18 03.8	75.3	18 53.7	74.7	10
6 00	16 51.7	79.1	17 41.6	78.5	18 31.4	77.9	19 21.1	77.3	20 10.7	76.7	6 00
5 50	18 10.0	81.1	18 59.7	80.5	19 49.4	79.9	20 38.9	79.3	21 28.4	78.7	5 50
40	19 28.7	83.2	20 18.4	82.6	21 07.9	82.0	21 57.3	81.4	22 46.6	80.8	40
30	20 47.7	85.3	21 37.3	84.7	22 26.8	84.0	23 16.0	83.4	24 05.2	82.8	30
20	22 07.1	87.4	22 56.6	86.7	23 46.0	86.1	24 35.2	85.5	25 24.3	84.9	20
10	23 26.6	89.5	24 16.1	88.8	25 05.4	88.2	25 54.5	87.6	26 43.6	86.9	10
5 00	24 46.1	91.6	25 35.6	91.0	26 24.9	90.3	27 14.1	89.7	28 03.0	89.0	5 00
4 50	26 05.4	93.7	26 54.9	93.1	27 44.2	92.4	28 33.4	91.8	29 22.5	91.1	4 50
40	27 24.7	95.9	28 14.3	95.3	29 03.7	94.6	29 52.9	94.0	30 41.9	93.3	40
30	28 43.6	98.1	29 33.2	97.5	30 22.7	96.8	31 12.1	96.2	32 01.2	95.5	30
20	30 01.9	100.4	30 51.8	99.7	31 41.4	99.1	32 30.9	98.4	33 20.1	97.7	20
10	31 19.8	102.7	32 09.8	102.0	32 59.7	101.3	33 49.2	100.6	34 38.7	100.0	10
4 00	32 37.1	105.0	33 27.3	104.3	34 17.3	103.6	35 07.2	103.0	35 56.7	102.3	4 00
3 50	33 53.4	107.3	34 43.8	106.7	35 34.2	106.0	36 24.2	105.3	37 13.9	104.6	3 50
40	35 08.8	109.7	35 59.5	109.1	36 50.1	108.4	37 40.4	107.7	38 30.4	107.0	40
30	36 23.1	112.2	37 14.1	111.5	38 05.0	110.9	38 55.5	110.2	39 45.9	109.5	30
20	37 35.9	114.7	38 27.3	114.0	39 18.6	113.4	40 09.6	112.7	41 00.3	112.0	20
10	38 47.4	117.3	39 39.2	116.6	40 30.7	116.0	41 22.1	115.3	42 13.3	114.6	10
3 00	39 57.2	119.9	40 49.4	119.3	41 41.5	118.6	42 33.3	117.9	43 24.8	117.2	3 00
2 50	41 05.2	122.6	41 57.9	122.0	42 50.3	121.3	43 42.6	120.7	44 34.6	120.0	2 50
40	42 11.0	125.4	43 04.2	124.8	43 57.2	124.1	44 50.0	123.5	45 42.5	122.8	40
30	43 14.7	128.3	44 08.4	127.7	45 01.8	127.0	45 55.2	126.4	46 48.2	125.7	30
20	44 15.8	131.2	35 10.0	130.6	46 04.1	130.0	46 57.9	129.3	47 51.5	128.7	20
10	45 14.2	134.2	46 09.0	133.6	47 03.7	133.0	47 58.0	132.4	48 52.2	131.8	10
2 00	46 09.7	137.3	47 05.1	136.7	48 00.3	136.1	48 55.3	135.5	49 50.1	134.9	2 00
1 50	47 02.0	140.5	47 57.9	139.9	48 53.7	139.4	49 49.2	138.8	50 44.7	138.2	1 50
40	47 50.8	143.7	48 47.3	143.2	49 43.7	142.7	50 39.9	142.1	51 36.0	141.6	40
30	48 36.0	147.1	49 33.0	146.6	50 30.0	146.1	51 26.7	145.6	52 23.4	145.1	30
20	49 17.2	150.5	50 14.8	150.1	51 12.3	149.6	52 09.7	149.1	53 06.9	148.7	20
10	49 54.3	154.0	50 52.3	153.6	51 50.4	153.2	52 48.2	152.8	53 46.1	152.3	10
1 00	50 26.9	157.6	51 25.5	157.2	52 23.9	156.8	53 22.4	156.5	54 20.7	156.1	1 00
0 50	50 55.0	161.2	51 53.9	160.9	52 52.7	160.6	53 51.6	160.3	54 50.5	159.9	0 50
40	51 18.1	164.9	52 17.5	164.6	53 16.8	164.4	54 16.1	164.1	55 15.3	163.8	40
30	51 36.4	168.6	52 35.9	168.4	53 35.6	168.2	54 35.1	168.0	55 34.7	167.8	30
20	51 49.5	172.4	52 49.3	172.3	53 49.1	172.1	54 48.9	172.0	55 48.7	171.9	20
10	51 57.4	176.2	52 57.2	176.1	53 57.4	176.0	54 57.2	176.0	55 57.2	175.9	10
0 00	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 19.5	92.1	0 28.6	92.6							5 50
40	2 38.8	94.2	1 47.9	94.8	0 56.9	95.3	0 06.0	95.8			40
30	3 58.0	96.4	3 07.0	96.9	2 15.9	97.4	1 24.8	97.9	0 33.8	98.5	30
20	5 16.8	98.5	4 25.7	99.0	3 34.5	99.6	2 43.4	100.1	1 52.2	100.6	20
10	6 35.2	100.6	5 43.9	101.2	4 52.6	101.7	4 01.4	102.2	3 10.1	102.7	10
5 00	7 53.0	102.8	7 01.6	103.3	6 10.2	103.8	5 18.7	104.4	4 27.2	104.9	5 00
4 50	9 10.2	105.0	8 18.6	105.5	7 27.0	106.0	6 35.3	106.5	5 43.8	107.0	4 50
40	10 26.5	107.2	9 34.8	107.7	8 42.9	108.2	7 51.1	108.7	6 59.2	109.2	40
30	11 42.0	109.4	10 50.0	109.9	9 57.9	110.4	9 05.9	110.9	8 13.8	111.4	30
20	12 56.5	111.6	12 04.3	112.1	11 12.0	112.6	10 19.6	113.1	9 27.2	113.6	20
10	14 09.8	113.8	13 17.2	114.3	12 24.8	114.8	11 32.1	115.3	10 39.4	115.8	10
4 00	15 21.9	116.1	14 29.1	116.6	13 36.3	117.1	12 43.4	117.6	11 50.4	118.0	4 00
3 50	16 32.6	118.4	15 39.6	118.9	14 46.2	119.3	13 53.0	119.8	12 59.8	120.3	3 50
40	17 41.7	120.7	16 48.3	121.2	15 54.7	121.6	15 01.0	122.1	14 07.5	122.6	40
30	18 49.2	123.0	17 55.4	123.5	17 01.6	124.0	16 07.6	124.4	15 13.7	124.9	30
20	19 54.9	125.4	19 00.8	125.9	18 06.5	126.4	17 12.2	126.8	16 17.9	127.2	20
10	20 58.7	127.8	20 04.2	128.3	19 09.6	128.8	18 14.8	129.2	17 20.2	129.6	10
3 00	22 00.4	130.3	21 05.5	130.7	20 10.5	131.2	19 15.5	131.6	18 20.4	132.0	3 00
2 50	22 59.8	132.8	22 04.6	133.2	21 09.2	133.6	20 13.7	134.0	19 18.3	134.4	2 50
40	23 57.0	135.3	23 01.3	135.7	22 05.5	136.1	21 09.7	136.5	20 13.8	136.9	40
30	24 51.6	137.9	23 55.6	138.2	22 59.3	138.6	22 03.1	139.0	21 06.9	139.4	30
20	25 43.6	140.5	24 47.1	140.8	23 50.5	141.2	22 53.9	141.6	21 57.2	141.9	20
10	26 32.8	143.1	25 35.9	143.4	24 38.9	143.8	23 41.9	144.1	22 44.9	144.5	10
2 00	27 19.1	145.8	26 21.8	146.1	25 24.4	146.4	24 27.0	146.7	23 29.6	147.1	2 00
1 50	28 02.2	148.5	27 04.6	148.8	26 06.8	149.1	25 09.1	149.4	24 11.3	149.7	1 50
40	28 42.1	151.2	27 44.1	151.5	26 46.1	151.8	25 48.0	152.0	24 49.9	152.3	40
30	29 18.7	154.0	28 20.4	154.2	27 22.0	154.5	26 23.6	154.7	25 25.2	155.0	30
20	29 51.9	156.8	28 53.2	157.0	27 54.5	157.2	26 55.8	157.5	25 57.0	157.7	20
10	30 21.9	159.6	29 22.5	159.8	28 23.5	160.0	27 24.4	160.2	26 25.5	160.4	10
1 00	30 47.3	162.5	29 48.1	162.7	28 48.8	162.8	27 49.5	163.0	26 50.2	163.2	1 00
0 50	31 09.3	165.4	30 09.8	165.5	29 10.3	165.6	28 10.9	165.8	27 11.4	165.9	0 50
40	31 27.5	168.3	30 27.8	168.4	29 28.2	168.5	28 28.5	168.6	27 28.8	168.7	40
30	31 41.7	171.2	30 41.8	171.3	29 42.0	171.3	28 42.2	171.4	27 42.4	171.5	30
20	31 51.8	174.1	30 51.9	174.2	29 52.0	174.2	28 52.0	174.3	27 52.1	174.4	20
10	31 58.0	177.0	30 58.0	177.1	29 58.0	177.1	28 58.0	177.1	27 58.1	177.2	10
0 00	32 0.0	180.0	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	1 01. 0	101. 1	0 09. 9	101. 6							5 20
10	2 18. 8	103. 2	1 27. 5	103. 7	0 36. 1	104. 3					10
5 00	3 35. 7	105. 4	2 44. 2	105. 9	1 52. 7	106. 4	1 01. 2	106. 9	0 09. 7	107. 4	4 50
4 50	4 52. 0	107. 5	4 00. 3	108. 0	3 08. 5	108. 5	2 16. 8	109. 0	1 25. 1	109. 5	4 50
40	6 07. 3	109. 7	5 15. 4	110. 2	4 23. 4	110. 7	3 31. 4	111. 2	2 39. 4	111. 7	40
30	7 21. 7	111. 9	6 29. 4	112. 4	5 37. 2	112. 9	4 45. 1	113. 3	3 52. 7	113. 8	30
20	8 34. 8	114. 1	7 42. 3	114. 6	6 49. 8	115. 1	5 57. 3	115. 5	5 04. 8	116. 0	20
10	9 46. 8	116. 3	8 54. 0	116. 8	8 01. 2	117. 3	7 08. 4	117. 7	6 15. 7	118. 2	10
4 00	10 57. 4	118. 5	10 04. 3	119. 0	9 11. 2	119. 5	8 18. 0	119. 9	7 24. 8	120. 4	4 00
3 50	12 06. 4	120. 8	11 13. 1	121. 2	10 19. 6	121. 7	9 26. 1	122. 1	8 32. 6	122. 6	3 50
40	13 13. 9	123. 1	12 20. 2	123. 5	11 26. 4	123. 9	10 32. 6	124. 4	9 38. 8	124. 9	40
30	14 19. 6	125. 4	13 25. 6	125. 8	12 31. 4	126. 2	11 37. 2	126. 7	10 43. 0	127. 1	30
20	15 23. 5	127. 7	14 29. 1	128. 1	13 34. 6	128. 5	12 40. 1	129. 0	11 45. 5	129. 4	20
10	16 25. 5	130. 0	15 30. 7	130. 4	14 35. 7	130. 8	13 40. 8	131. 3	12 45. 9	131. 7	10
3 00	17 25. 3	132. 4	16 30. 1	132. 8	15 34. 8	133. 2	14 39. 5	133. 6	13 44. 2	134. 0	3 00
2 50	18 22. 8	134. 8	17 27. 3	135. 2	16 31. 5	135. 6	15 35. 8	136. 0	14 40. 1	136. 4	2 50
40	19 17. 9	137. 3	18 21. 9	137. 7	17 25. 9	138. 0	16 29. 8	138. 4	15 33. 7	138. 8	40
30	20 10. 6	139. 8	19 14. 2	140. 1	18 17. 7	140. 4	17 21. 4	140. 8	16 24. 9	141. 2	30
20	21 00. 5	142. 3	20 03. 8	142. 6	19 07. 0	142. 9	18 10. 2	143. 3	17 13. 4	143. 6	20
10	21 47. 8	144. 8	20 50. 7	145. 1	19 53. 6	145. 4	18 56. 4	145. 8	17 59. 2	146. 1	10
2 00	22 32. 2	147. 4	21 34. 7	147. 7	20 37. 2	148. 0	19 39. 6	148. 3	18 42. 0	148. 6	2 00
1 50	23 13. 6	150. 0	22 15. 7	150. 3	21 17. 7	150. 5	20 19. 9	150. 8	19 21. 9	151. 1	1 50
40	23 51. 7	152. 6	22 53. 6	152. 9	21 55. 3	153. 1	20 57. 1	153. 4	19 58. 8	153. 6	40
30	24 26. 7	155. 3	23 28. 2	155. 5	22 29. 6	155. 7	21 31. 0	156. 0	20 32. 6	156. 2	30
20	24 58. 2	157. 9	23 59. 4	158. 1	23 00. 6	158. 3	22 01. 8	158. 6	21 03. 0	158. 8	20
10	25 26. 4	160. 6	24 27. 4	160. 8	23 28. 2	161. 0	22 29. 2	161. 2	21 30. 1	161. 4	10
1 00	25 50. 9	163. 4	24 51. 6	163. 5	23 52. 3	163. 7	22 53. 0	163. 8	21 53. 7	164. 0	1 00
0 50	26 11. 9	166. 1	25 12. 4	166. 2	24 12. 8	166. 4	23 13. 4	166. 5	22 13. 9	166. 6	0 50
40	26 29. 1	168. 9	25 29. 5	169. 0	24 29. 8	169. 1	23 30. 1	169. 2	22 30. 4	169. 3	40
30	26 42. 6	171. 6	25 42. 8	171. 7	24 42. 9	171. 8	23 43. 1	171. 9	22 43. 3	172. 0	30
20	26 52. 2	174. 4	25 52. 3	174. 5	24 52. 4	174. 5	23 52. 5	174. 6	22 52. 6	174. 6	20
10	26 58. 1	177. 2	25 58. 1	177. 2	24 58. 1	177. 2	23 58. 1	177. 3	22 58. 2	177. 3	10
0 00	27 0. 0	180. 0	26 0. 0	180. 0	25 0. 0	180. 0	24 0. 0	180. 0	23 0. 0	180. 0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 33.2	110.1									4 50
40	1 47.4	112.2	0 55.3	112.7	0 03.3	113.2					40
30	3 00.4	114.3	2 08.1	114.8	1 15.8	115.3	0 23.5	115.8			30
20	4 12.2	116.5	3 19.6	117.0	2 27.0	117.5	1 34.4	117.9	0 41.8	118.4	20
10	5 22.5	118.7	4 29.7	119.1	3 36.8	119.6	2 43.8	120.1	1 50.9	120.6	10
4 00	6 31.6	120.9	5 38.4	121.3	4 45.1	121.8	3 51.9	122.3	2 58.6	122.7	4 00
3 50	7 39.1	123.1	6 45.5	123.5	5 51.9	124.0	4 58.3	124.4	4 04.7	124.9	3 50
40	8 44.9	125.3	7 50.9	125.7	6 57.0	126.2	6 03.0	126.6	5 09.0	127.1	40
30	9 48.7	127.5	8 54.4	127.9	8 00.2	128.4	7 05.9	128.8	6 11.5	129.3	30
20	10 50.9	129.8	9 56.2	130.2	9 01.5	130.7	8 06.8	131.1	7 12.1	131.5	20
10	11 50.8	132.1	10 55.8	132.5	10 00.8	133.0	9 05.7	133.3	8 10.6	133.7	10
3 00	12 48.8	134.4	11 53.4	134.8	10 57.9	135.3	10 02.4	135.6	9 06.9	136.0	3 00
2 50	13 44.4	136.7	12 48.5	137.1	11 52.7	137.5	10 56.8	137.9	10 01.0	138.2	2 50
40	14 37.6	139.1	13 41.4	139.5	12 45.2	139.9	11 48.9	140.2	10 52.7	140.6	40
30	15 28.3	141.5	14 31.7	141.9	13 35.1	142.2	12 38.5	142.5	11 41.9	142.9	30
20	16 16.5	144.0	15 19.5	144.3	14 22.6	144.6	13 25.6	144.9	12 28.5	145.3	20
10	17 01.9	146.4	16 04.5	146.7	15 07.9	147.0	14 09.8	147.3	13 12.5	147.6	10
2 00	17 44.4	148.9	16 46.8	149.2	15 49.1	149.5	14 51.3	149.7	13 53.7	150.0	2 00
1 50	18 24.4	151.4	17 25.9	151.6	16 27.9	151.9	15 29.9	152.1	14 31.9	152.4	1 50
40	19 00.5	153.9	18 02.2	154.1	17 03.9	154.4	16 05.6	154.6	15 07.1	154.9	40
30	19 33.9	156.4	18 35.3	156.6	17 36.7	156.7	16 38.1	157.1	15 39.4	157.3	30
20	20 04.1	159.0	19 05.2	159.2	18 06.3	159.4	17 07.4	159.6	16 08.5	159.8	20
10	20 30.9	161.6	19 31.7	161.7	18 32.6	161.9	17 33.4	162.1	16 34.3	162.3	10
1 00	20 54.3	164.2	19 55.0	164.3	18 55.6	164.5	17 56.2	164.6	16 56.8	164.8	1 00
0 50	21 14.3	166.8	20 14.6	166.9	19 15.2	167.0	18 15.6	167.2	17 16.0	167.3	0 50
40	21 30.7	169.4	20 30.9	169.5	19 31.2	169.6	18 31.5	169.7	17 31.8	169.8	40
30	21 43.5	172.0	20 43.6	172.1	19 43.8	172.2	18 43.9	172.3	17 44.1	172.3	30
20	21 52.7	174.7	20 52.7	174.8	19 52.8	174.8	18 52.9	174.8	17 52.9	174.9	20
10	21 58.1	177.3	20 58.1	177.4	19 58.2	177.4	18 58.1	177.4	17 58.2	177.4	10
0 00	22 0.0	180.0	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 10	0 58.0	121.0	0 05.0	121.5							4 10
4 00	2 05.3	123.2	1 12.0	123.6	0 18.7	124.1					4 00
3 50	3 11.0	125.3	2 17.4	125.7	1 23.7	126.2	0 30.1	126.7			3 50
40	4 15.0	127.5	3 20.9	127.9	2 26.9	128.4	1 32.9	128.8	0 38.8	129.2	40
30	5 17.1	129.7	4 22.8	130.1	3 28.3	130.6	2 33.9	131.0	1 39.4	131.4	30
20	6 17.3	131.9	5 22.5	132.3	4 27.7	132.7	3 32.9	133.1	2 38.1	133.5	20
10	7 15.4	134.1	6 20.2	134.5	5 25.1	134.9	4 29.9	135.3	3 34.7	135.7	10
3 00	8 11.4	136.4	7 15.8	136.8	6 20.3	137.1	5 24.7	137.5	4 29.1	137.9	3 00
2 50	9 05.1	138.6	8 09.1	139.0	7 13.1	139.3	6 17.1	139.7	5 21.2	140.1	2 50
40	9 56.4	140.9	9 00.1	141.3	8 03.8	141.6	7 07.4	142.0	6 11.1	142.3	40
30	10 45.2	143.2	9 48.7	143.6	8 51.9	143.9	7 55.1	144.2	6 58.4	144.5	30
20	11 31.5	145.6	10 34.5	145.9	9 37.4	146.2	8 40.3	146.5	7 43.2	146.8	20
10	12 15.1	147.9	11 17.7	148.2	10 20.3	148.5	9 22.9	148.8	8 25.4	149.1	10
2 00	12 56.0	150.3	11 58.2	150.6	11 00.4	150.9	10 02.6	151.1	9 04.8	151.4	2 00
1 50	13 33.9	152.7	12 35.8	152.9	11 37.7	153.2	10 39.6	153.4	9 41.6	153.7	1 50
40	14 08.8	155.1	13 10.4	155.3	12 12.0	155.6	11 13.6	155.8	10 15.2	156.1	40
30	14 40.8	157.5	13 42.1	157.7	12 43.4	158.0	11 44.7	158.2	11 46.1	158.4	30
20	15 09.5	160.0	14 10.6	160.2	13 11.7	160.4	12 12.7	160.6	11 13.8	160.8	20
10	15 35.1	162.4	14 36.0	162.6	13 36.8	162.8	12 37.7	163.0	11 38.4	163.1	10
1 00	15 57.4	164.9	14 58.0	165.1	13 58.6	165.2	12 59.3	165.4	11 59.9	165.5	1 00
0 50	16 16.5	167.4	15 16.9	167.5	14 17.3	167.7	13 17.7	167.8	12 18.2	167.9	0 50
40	16 32.1	169.9	15 32.3	170.0	14 32.6	170.1	13 32.9	170.2	12 33.2	170.3	40
30	16 44.4	172.4	15 44.4	172.5	14 44.6	172.6	13 44.7	172.6	12 44.9	172.7	30
20	16 53.0	175.0	15 53.0	175.0	14 53.1	175.1	13 53.2	175.1	12 53.3	175.2	20
10	16 58.3	177.5	15 58.3	177.5	14 58.3	177.5	13 58.3	177.5	12 58.3	177.6	10
0 00	17 0.0	180.0	16 0.0	180.0	14 0.0	180.0	14 0.0	180.0	13 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 30	0 45.1	131.8									3 30
20	1 43.3	134.0	0 48.5	134.3							20
10	2 39.5	136.1	1 44.2	136.5	0 48.9	136.9					10
3 00	3 33.5	138.3	2 37.9	138.6	1 42.3	139.0	0 46.6	139.4			3 00
2 50	4 25.3	140.4	3 29.2	140.8	2 33.2	141.2	1 37.2	141.5	0 41.2	141.9	2 50
40	5 14.7	142.6	4 18.3	143.0	3 21.9	143.3	2 25.5	143.7	1 29.1	144.0	40
30	6 01.7	144.8	5 04.9	145.2	4 08.1	145.5	3 11.4	145.9	2 14.6	146.2	30
20	6 46.1	147.1	5 49.0	147.4	4 51.8	147.7	3 54.7	148.1	2 57.5	148.4	20
10	7 28.0	149.4	6 30.4	149.7	5 32.9	149.9	4 35.4	150.2	3 37.9	150.5	10
2 00	8 07.0	151.7	7 09.2	151.9	6 11.4	152.2	5 13.5	152.5	4 15.7	152.7	2 00
1 50	8 43.4	154.0	7 45.2	154.2	6 47.1	154.4	5 48.9	154.7	4 50.7	154.9	1 50
40	9 16.8	156.3	8 18.4	156.5	7 19.9	156.7	6 21.5	157.0	5 23.0	157.2	40
30	10 39.2	158.6	9 39.9	158.8	8 40.7	159.0	7 41.6	159.2	6 42.3	159.4	30
20	10 14.8	160.9	9 15.8	161.1	8 16.8	161.3	7 17.8	161.5	6 18.8	161.7	20
10	10 39.2	163.3	9 39.9	163.4	8 40.7	163.6	7 41.6	163.8	6 42.3	164.0	10
1 00	11 00.5	165.7	10 01.1	165.8	9 01.7	166.0	8 02.2	166.1	7 02.8	166.2	1 00
0 50	11 18.6	168.0	10 19.0	168.1	9 19.3	168.3	8 19.7	168.4	7 20.2	168.5	0 50
40	11 33.4	170.4	10 33.7	170.5	9 34.0	170.6	8 34.2	170.7	7 34.5	170.8	40
30	11 45.1	172.8	10 45.2	172.9	9 45.3	172.9	8 45.5	173.0	7 45.7	173.1	30
20	11 53.4	175.2	10 53.5	175.3	9 53.5	175.3	8 53.6	175.3	7 53.6	175.4	20
10	11 58.3	177.6	10 58.3	177.6	9 58.3	177.6	8 58.4	177.6	7 58.4	177.7	10
0 00	12 0.0	180.0	11 0.0	180.0	10 0.0	180.0	9 0.0	180.0	8 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 00.1	84.2	0 51.7	83.7	6 20
6 10					0 25.6	86.8	1 17.2	86.3	2 08.6	85.8	6 10
6 00	0 00.0	90.0	0 51.5	89.5	1 42.9	89.0	2 34.3	88.5	3 25.7	87.9	6 00
5 50	1 17.3	92.1	2 08.8	91.6	3 00.1	91.1	3 51.6	90.6	4 42.9	90.0	5 50
40	2 34.4	94.3	3 25.8	93.8	4 17.3	93.2	5 08.7	92.7	6 00.2	92.2	40
30	3 51.3	96.4	4 42.8	95.9	5 34.2	95.4	6 25.8	94.9	7 17.3	94.3	30
20	5 07.9	98.6	5 59.5	98.1	6 51.1	97.6	7 42.7	97.1	8 34.2	96.5	20
10	6 24.0	100.7	7 15.8	100.2	8 07.4	99.7	8 59.2	99.2	9 50.8	98.7	10
5 00	7 39.6	102.9	8 31.5	102.4	9 23.3	101.9	10 15.1	101.4	11 06.9	100.9	5 00
4 50	8 54.6	105.1	9 46.6	104.6	10 38.6	104.1	11 30.6	103.6	12 22.5	103.1	4 50
40	10 08.7	107.3	11 01.0	106.8	11 53.1	106.3	12 45.3	105.8	13 37.4	105.3	40
30	11 22.1	109.5	12 14.4	109.0	13 06.8	108.5	13 59.2	108.0	14 51.4	107.5	30
20	12 34.3	111.8	13 27.0	111.3	14 19.6	110.8	15 12.2	110.3	16 04.7	109.8	20
10	13 45.4	114.0	14 38.4	113.6	15 31.2	113.1	16 24.1	112.6	17 16.8	112.1	10
4 00	14 55.4	116.3	15 48.6	115.9	16 41.8	115.4	17 34.8	114.9	18 27.8	114.4	4 00
3 50	16 03.9	118.6	16 57.4	118.2	17 50.8	117.7	18 44.2	117.2	19 37.5	116.7	3 50
40	17 11.0	121.0	18 04.8	120.5	18 58.5	120.0	19 52.1	119.6	20 45.7	119.1	40
30	18 16.3	123.3	19 10.4	122.9	20 04.6	122.4	20 58.6	122.0	21 52.4	121.5	30
20	19 20.0	125.7	20 14.5	125.3	21 08.9	124.8	22 03.2	124.4	22 57.5	123.9	20
10	20 21.8	128.1	21 16.6	127.7	22 11.3	127.3	23 06.0	126.8	24 00.6	126.4	10
3 00	21 21.5	130.6	22 16.6	130.2	23 11.8	129.8	24 06.8	129.3	25 01.8	128.9	3 00
2 50	22 18.9	133.1	23 14.6	132.7	24 10.0	132.3	25 05.6	131.8	26 00.9	131.4	2 50
40	23 14.2	135.6	24 10.2	135.2	25 06.1	134.8	26 01.9	134.4	26 57.6	134.0	40
30	24 07.0	138.2	25 03.3	137.8	25 59.7	137.4	26 55.9	137.0	27 51.9	136.6	30
20	24 57.3	140.8	25 53.9	140.4	26 50.5	140.0	27 47.2	139.7	28 43.7	139.3	20
10	25 44.7	143.4	26 41.8	143.0	27 38.9	142.7	28 35.9	142.4	29 32.8	142.0	10
2 00	26 29.4	146.0	27 26.9	145.7	28 24.3	145.4	29 21.6	145.1	30 18.9	144.7	2 00
1 50	27 11.0	148.7	28 08.8	148.4	29 06.6	148.1	30 04.2	147.8	31 02.0	147.5	1 50
40	27 49.6	151.5	28 47.7	151.2	29 45.8	150.9	30 43.8	150.6	31 41.9	150.3	40
30	28 24.8	154.2	29 23.2	154.0	30 21.8	153.7	31 20.1	153.4	32 18.5	153.1	30
20	28 56.7	157.0	29 55.5	156.8	30 54.2	156.5	31 52.9	156.3	32 51.6	156.0	20
10	29 25.1	159.8	30 24.2	159.6	31 23.2	159.4	32 22.2	159.2	33 21.2	158.9	10
1 00	29 50.0	162.6	30 49.3	162.5	31 48.5	162.3	32 47.8	162.1	33 47.0	161.9	1 00
0 50	30 11.2	165.5	31 10.8	165.4	32 10.2	165.2	33 09.7	165.1	34 09.2	164.9	0 50
40	30 28.7	168.4	31 28.4	168.3	32 28.1	168.1	33 27.7	168.0	34 27.4	167.9	40
30	30 42.4	171.3	31 42.1	171.2	32 42.0	171.1	33 41.7	171.0	34 41.6	170.9	30
20	30 52.1	174.2	31 52.1	174.1	32 51.9	174.1	33 51.9	174.0	34 51.8	173.9	20
10	30 58.0	177.1	31 58.1	177.1	32 58.0	177.0	33 58.0	177.0	34 58.0	176.9	10
0 00	31 0.0	180.0	32 0.0	180.0	33 0.0	180.0	34 0.0	180.0	35 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 08.4	72.6	7 00
6 50							0 30.7	75.2	1 22.4	74.7	6 50
40			0 02.3	78.3	0 54.0	77.8	1 45.7	77.3	2 37.4	76.8	40
30	0 26.6	81.0	1 18.2	80.5	2 09.8	80.0	3 01.3	79.5	3 52.9	79.0	30
20	1 43.1	83.1	2 34.6	82.6	3 26.1	82.1	4 17.5	81.6	5 09.0	81.1	20
10	2 59.9	85.3	3 51.4	84.7	4 42.9	84.2	5 34.2	83.7	6 25.4	83.2	10
6 00	4 17.1	87.4	5 08.5	86.9	5 59.8	86.4	6 51.1	85.9	7 42.4	85.3	6 00
5 50	5 34.3	89.5	6 25.6	89.0	7 16.9	88.5	8 08.3	88.0	8 59.4	87.5	5 50
40	6 51.5	91.7	7 42.9	91.2	8 34.2	90.7	9 25.4	90.1	10 16.7	89.6	40
30	8 08.7	93.8	9 00.1	93.3	9 51.3	92.8	10 42.7	92.3	11 33.9	91.7	30
20	9 25.7	96.0	10 17.2	95.5	11 08.5	95.0	11 59.9	94.5	12 51.1	93.9	20
10	10 42.3	98.2	11 33.9	97.7	12 25.3	97.1	13 16.7	96.6	14 08.0	96.1	10
5 00	11 58.6	100.4	12 50.2	99.9	13 41.8	99.3	14 33.3	98.8	15 24.7	98.3	5 00
4 50	13 14.2	102.6	14 06.0	102.1	14 57.6	101.5	15 49.4	101.0	16 41.0	100.5	4 50
40	14 29.4	104.8	15 21.3	104.3	16 13.1	103.7	17 04.9	103.2	17 56.7	102.7	40
30	15 43.6	107.0	16 35.8	106.5	17 27.7	106.0	18 19.7	105.4	19 11.6	104.9	30
20	16 57.1	109.3	17 49.5	108.8	18 41.7	108.3	19 33.8	107.7	20 25.8	107.2	20
10	18 09.4	111.6	19 02.0	111.1	19 54.4	110.6	20 46.9	110.0	21 39.2	109.5	10
4 00	19 20.7	113.9	20 13.5	113.4	21 06.3	112.9	21 58.9	112.4	22 51.4	111.8	4 00
3 50	20 30.6	116.2	21 23.8	115.7	22 16.8	115.2	23 09.8	114.7	24 02.5	114.2	3 50
40	21 39.3	118.6	22 32.7	118.1	23 26.0	117.6	24 19.2	117.1	25 12.3	116.6	40
30	22 46.2	121.0	23 40.0	120.5	24 33.6	120.0	25 27.2	119.5	26 20.6	119.0	30
20	23 51.7	123.5	24 45.8	123.0	25 39.7	122.5	26 33.6	122.0	27 27.3	121.5	20
10	24 55.2	126.0	25 49.6	125.5	26 43.9	125.0	27 38.2	124.5	28 32.3	124.0	10
3 00	25 56.7	128.4	26 51.6	128.0	27 46.3	127.5	28 40.9	127.1	29 35.4	126.6	3 00
2 50	26 56.1	131.0	27 51.3	130.6	28 46.5	130.1	29 41.5	129.7	30 36.4	129.2	2 50
40	27 53.3	133.6	28 48.9	133.2	29 44.4	132.7	30 39.8	132.3	31 35.2	131.8	40
30	28 48.0	136.2	29 54.1	135.8	30 39.9	135.4	31 35.7	135.0	32 31.5	134.5	30
20	29 40.2	138.9	30 36.5	138.5	31 32.9	138.1	32 29.1	137.7	33 25.3	137.3	20
10	30 29.6	141.6	31 26.4	141.2	32 23.1	140.8	33 19.7	140.5	34 16.3	140.1	10
2 00	31 16.2	144.4	32 13.3	144.0	33 10.4	143.6	34 07.4	143.3	35 04.3	142.9	2 00
1 50	31 59.6	147.2	32 57.2	146.8	33 54.7	146.5	34 52.2	146.1	35 49.5	145.8	1 50
40	32 39.9	150.0	33 37.8	149.7	34 35.7	149.4	35 33.5	149.0	26 31.3	148.7	40
30	33 16.8	152.9	34 15.1	152.6	35 13.3	152.3	36 11.5	152.0	37 09.7	151.7	30
20	33 50.3	155.8	34 49.0	155.5	35 47.5	155.3	36 46.0	155.0	37 44.6	154.7	20
10	34 20.2	158.7	35 19.1	158.5	36 17.9	158.3	37 16.8	158.0	38 15.6	157.8	10
1 00	34 46.2	161.7	35 45.5	161.5	36 44.6	161.3	37 43.8	161.1	38 42.9	160.9	1 00
0 50	35 08.6	164.7	36 08.1	164.5	37 07.4	164.4	38 06.9	164.2	39 06.2	164.0	0 50
40	35 27.0	167.7	36 26.6	167.6	37 26.2	167.5	38 25.8	167.3	39 25.5	167.2	40
30	35 41.4	170.8	36 41.2	170.7	37 41.0	170.6	38 40.7	170.4	39 40.5	170.3	30
20	35 51.7	173.8	36 51.6	173.8	37 51.5	173.7	38 51.4	173.6	39 51.3	173.6	20
10	35 57.9	176.9	36 57.9	176.9	37 57.9	176.8	38 57.9	176.8	39 57.8	176.8	10
0 00	36 0.0	180.0	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	40 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 30							0 02.7	64.1	0 55.5	63.7	7 30
20					0 20.4	66.8	1 12.9	66.3	2 05.4	65.8	20
10			0 39.7	69.5	1 31.9	68.9	2 24.1	68.4	3 16.3	67.9	10
7 00	1 00.4	72.1	1 52.5	71.6	2 44.5	71.1	3 36.5	70.6	4 28.5	70.1	7 00
6 50	2 14.4	74.2	3 06.1	73.7	3 58.0	73.2	4 49.8	72.7	5 41.6	72.2	6 50
40	3 29.0	76.3	4 20.7	75.8	5 12.4	75.3	6 04.0	74.8	6 55.6	74.3	40
30	4 44.4	78.4	5 35.9	77.9	6 27.5	77.4	7 18.9	76.9	8 10.3	76.4	30
20	6 00.4	80.6	6 51.8	80.1	7 43.1	79.5	8 34.4	79.0	9 25.7	78.5	20
10	7 16.9	82.7	8 08.1	82.2	8 59.4	81.6	9 50.6	81.1	10 41.7	80.6	10
6 00	8 33.6	84.8	9 24.8	84.3	10 15.9	83.8	11 07.1	83.2	11 58.1	82.7	6 00
5 50	9 50.7	86.9	10 41.9	86.4	11 32.9	85.9	12 23.9	85.3	13 14.9	84.8	5 50
40	11 07.9	89.1	11 59.0	88.5	12 50.0	88.0	13 41.0	87.5	14 32.0	86.9	40
30	12 25.1	91.2	13 16.2	90.7	14 07.2	90.1	14 58.2	89.6	15 49.1	89.0	30
20	13 42.9	93.4	14 33.4	92.9	15 24.5	92.3	16 15.5	91.7	17 06.4	91.2	20
10	14 59.3	95.5	15 50.5	95.0	16 41.6	94.4	17 32.7	93.9	18 23.6	93.3	10
5 00	16 16.1	97.7	17 07.4	97.2	17 58.5	96.6	18 49.6	96.1	19 40.6	95.5	5 50
4 50	17 32.4	99.9	18 23.8	99.4	19 15.1	98.8	20 06.2	98.3	20 57.3	97.7	4 50
40	18 48.3	102.2	19 39.8	101.6	20 31.2	101.1	21 22.5	100.5	22 13.7	99.9	40
30	20 03.4	104.4	20 55.2	103.8	21 46.6	103.3	22 38.1	102.7	23 29.5	102.2	30
20	21 17.9	106.7	22 09.8	106.1	23 01.5	105.6	23 63.2	105.0	24 44.7	104.5	20
10	22 31.3	109.0	23 23.5	108.4	24 15.5	107.9	25 07.3	107.3	25 59.0	106.8	10
4 00	23 43.9	111.3	24 36.3	110.8	25 28.5	110.2	26 20.6	109.7	27 12.5	109.1	4 00
3 50	24 55.3	113.7	25 47.9	113.2	26 40.4	112.6	27 32.8	112.1	28 24.9	111.5	3 50
40	26 05.4	116.1	26 58.3	115.6	27 51.1	115.0	28 43.7	114.5	29 36.3	113.9	40
30	27 14.0	118.5	28 07.3	118.0	29 00.4	117.5	29 53.3	116.9	30 46.1	116.4	30
20	28 21.1	121.0	29 14.7	120.5	30 08.1	120.0	31 01.4	119.4	31 54.6	118.9	20
10	29 26.3	123.5	30 20.4	123.0	31 14.2	122.5	32 07.9	122.0	33 01.4	121.4	10
3 00	30 29.9	126.1	31 24.3	125.6	32 18.5	125.1	33 12.5	124.6	34 06.5	124.0	3 00
2 50	31 31.4	128.7	32 26.0	128.2	33 20.5	127.7	34 15.1	127.2	35 09.3	126.7	2 50
40	32 30.4	131.4	33 25.6	130.9	34 20.6	130.4	35 15.5	129.9	36 10.2	129.4	40
30	33 27.2	134.1	34 22.7	133.6	35 18.2	133.1	36 13.5	132.7	37 08.7	132.2	30
20	34 21.4	136.8	35 17.4	136.4	36 13.3	135.9	37 09.1	135.5	38 04.7	135.0	20
10	35 12.8	139.6	36 09.2	139.2	37 05.5	138.8	38 01.8	138.4	38 57.8	137.9	10
2 00	36 01.3	142.5	36 58.2	142.1	37 55.0	141.7	38 51.7	141.3	39 48.2	140.8	2 00
1 50	36 46.7	145.4	37 44.2	145.0	38 41.3	144.7	39 38.4	144.3	40 35.4	143.8	1 50
40	37 29.1	148.4	38 26.7	148.0	39 24.3	147.7	40 21.8	147.3	41 19.3	146.9	40
30	38 07.7	151.4	39 05.9	151.0	40 03.9	150.7	41 01.9	150.4	41 59.7	150.0	30
20	38 43.0	154.4	39 41.5	154.1	40 39.9	153.8	41 38.2	153.5	42 36.5	153.2	20
10	39 14.5	157.5	40 13.3	157.2	41 12.0	157.0	42 10.7	156.7	43 09.2	156.4	10
1 00	39 42.1	160.7	40 41.2	160.4	41 40.2	160.2	42 39.2	159.9	43 38.2	159.7	1 00
0 50	40 05.6	163.8	41 05.0	163.6	42 04.3	163.4	43 03.6	163.2	44 02.9	163.0	0 50
40	40 25.1	167.0	41 24.6	166.9	42 24.2	166.7	43 23.7	166.5	44 23.3	166.4	40
30	40 40.3	170.2	41 40.1	170.1	42 39.7	170.0	43 39.7	169.9	44 39.2	169.7	30
20	40 51.2	173.5	41 51.1	173.4	42 51.0	173.3	43 50.9	173.2	44 50.8	173.2	20
10	40 57.8	176.7	41 57.8	176.7	42 57.7	176.6	43 57.8	176.6	44 57.7	176.6	10
0 00	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	45 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00					0 14.9	55.9	1 08.6	55.5	2 02.3	55.0	8 00
7 50			0 26.4	58.5	1 19.7	58.1	2 12.8	57.6	3 06.4	57.1	7 50
40	0 39.9	61.1	1 32.9	60.6	2 26.0	60.2	3 19.1	59.7	4 12.1	59.2	40
30	1 49.7	63.2	2 41.0	62.7	3 33.7	62.3	4 26.4	61.8	5 19.1	61.3	30
20	2 57.8	65.3	3 50.3	64.9	4 42.7	64.4	5 35.2	63.9	6 27.6	63.4	20
10	4 08.7	67.5	5 00.8	67.0	5 53.0	66.5	6 45.1	66.0	7 37.2	65.5	10
7 00	5 20.5	69.6	6 12.4	69.1	7 04.4	68.6	7 56.3	68.1	8 48.2	67.6	7 00
6 50	6 33.4	71.7	7 25.1	71.1	8 16.8	70.6	9 08.4	70.1	10 00.1	69.6	6 50
40	7 47.2	73.8	8 38.1	73.2	9 30.1	72.7	10 21.6	72.2	11 13.0	71.7	40
30	9 01.7	75.9	9 53.1	75.3	10 44.3	74.8	11 35.4	74.3	12 26.7	73.7	30
20	10 16.9	78.0	11 03.5	77.4	11 59.2	76.9	12 50.3	76.4	13 41.2	75.8	20
10	11 32.8	80.1	12 23.8	79.5	13 14.8	79.0	14 05.6	78.4	14 56.4	77.9	10
6 00	12 49.1	82.2	13 39.9	81.6	14 30.8	81.1	15 21.5	80.5	16 12.2	80.0	6 00
5 50	14 05.8	84.3	14 56.6	83.7	15 47.3	83.2	16 38.0	82.6	17 28.6	82.0	5 50
40	15 22.7	86.4	16 13.5	85.8	17 04.2	85.3	17 54.8	84.7	18 45.2	84.1	40
30	16 39.9	88.5	17 30.7	87.9	18 21.2	87.4	19 11.8	86.8	20 02.2	86.2	30
20	17 57.1	90.6	18 47.8	90.1	19 38.4	89.5	20 29.0	88.9	21 19.4	88.3	20
10	19 14.6	92.8	20 05.1	92.2	20 55.7	91.6	21 46.2	91.0	22 36.6	90.4	10
5 00	20 31.5	95.0	21 22.2	94.4	22 12.9	93.8	23 03.5	93.2	23 53.9	92.6	5 00
4 50	21 48.3	97.2	22 39.1	96.6	23 29.8	96.0	24 20.4	95.4	25 10.9	94.8	4 50
40	23 04.7	99.4	23 55.7	98.8	24 46.5	98.2	25 37.3	97.6	26 27.8	97.0	40
30	24 20.8	101.6	25 11.8	101.0	26 02.8	100.4	26 53.6	99.8	27 44.2	99.2	30
20	25 36.0	103.9	26 27.3	103.3	27 18.4	102.7	28 09.4	102.1	29 00.2	101.5	20
10	26 50.7	106.2	27 41.9	105.6	28 33.4	105.0	29 24.5	104.4	30 15.6	103.8	10
4 00	28 04.3	108.6	28 56.0	108.0	29 47.6	107.4	30 39.0	106.8	31 30.2	106.2	4 00
3 50	29 17.1	110.9	30 09.1	110.4	31 00.8	109.8	31 52.5	109.2	32 43.9	108.6	3 50
40	30 28.6	113.3	31 20.8	112.8	32 12.9	112.2	33 04.9	111.6	33 56.7	111.0	40
30	31 38.9	115.8	32 31.5	115.3	33 23.8	114.7	34 16.1	114.1	35 08.2	113.5	30
20	32 47.7	118.3	33 40.5	117.8	34 33.3	117.2	35 25.9	116.6	36 18.3	116.0	20
10	33 54.9	120.9	34 48.1	120.3	35 41.4	119.8	36 34.3	119.2	37 27.0	118.6	10
3 00	35 00.3	123.5	35 53.9	123.0	36 47.3	122.4	37 40.7	121.8	38 34.0	121.2	3 00
2 50	36 03.7	126.2	36 57.7	125.6	37 51.6	125.1	38 45.3	124.5	39 39.0	123.9	2 50
40	37 04.8	128.9	37 59.4	128.4	38 53.7	127.8	39 48.0	127.3	40 42.0	126.7	40
30	38 03.8	131.7	38 59.0	131.2	39 53.6	130.7	40 48.2	130.1	41 42.7	129.5	30
20	39 00.2	134.5	39 55.6	134.0	40 50.9	133.5	41 46.0	133.0	42 41.2	132.5	20
10	39 53.9	137.4	40 49.8	136.9	41 45.8	136.5	42 41.2	136.0	43 36.7	135.5	10
2 00	40 44.6	149.4	41 41.0	139.9	42 37.3	139.5	43 33.4	139.0	44 29.4	138.5	2 00
1 50	41 32.4	143.4	42 29.2	143.0	43 25.8	142.6	44 22.5	142.1	45 19.1	141.6	1 50
40	42 16.6	146.5	43 13.9	146.1	44 11.1	145.7	45 08.3	145.3	46 05.3	144.8	40
30	42 57.6	149.7	43 55.2	149.3	44 53.0	148.9	45 50.5	148.5	46 48.1	148.1	30
20	43 34.7	152.9	44 32.8	152.5	45 30.9	152.2	46 29.0	151.8	47 26.9	151.4	20
10	44 07.9	156.1	45 06.5	155.8	46 05.1	155.5	47 03.4	155.2	48 01.8	154.8	10
1 00	44 37.1	159.4	45 36.0	159.2	46 35.0	158.9	47 33.8	158.6	48 32.6	158.3	1 00
0 50	45 02.1	162.8	46 01.5	162.5	47 00.5	162.3	47 59.7	162.1	48 58.9	161.8	0 50
40	45 22.8	166.2	46 22.2	166.0	47 21.7	165.8	48 21.2	165.6	49 20.6	165.4	40
30	45 39.0	169.6	46 38.8	169.5	47 38.5	169.3	48 38.0	169.2	49 37.8	169.0	30
20	45 50.7	173.1	46 50.5	173.0	47 50.4	172.9	48 50.2	172.8	49 50.1	172.7	20
10	45 57.7	176.5	46 57.7	176.5	47 57.5	176.4	48 57.5	176.4	49 57.5	176.3	10
0 00	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	50 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	2 56.0	54.6	3 49.7	54.1	4 43.4	53.7	5 37.1	53.2	6 30.7	52.8	8 00
7 50	3 59.7	56.7	4 53.2	56.2	5 46.4	55.7	6 39.7	55.3	7 32.9	54.8	7 50
40	5 05.1	58.8	5 58.1	58.3	6 51.1	57.8	7 44.6	57.4	8 36.9	56.9	40
30	6 11.8	60.8	7 04.6	60.3	7 57.2	59.8	8 49.8	59.4	9 42.4	58.9	30
20	7 20.0	62.9	8 12.3	62.4	9 04.6	61.9	9 57.0	61.4	10 49.2	60.9	20
10	8 29.3	65.0	9 21.5	64.5	10 13.5	63.9	11 05.4	63.5	11 57.4	62.9	10
7 00	9 40.0	67.0	10 31.8	66.5	11 23.5	66.0	12 15.1	65.5	13 06.7	65.0	7 00
6 50	10 51.6	69.0	11 43.2	68.5	12 34.6	68.0	13 26.0	67.5	14 17.3	67.0	6 50
40	12 04.2	71.1	12 55.5	70.6	13 46.7	70.1	14 37.8	69.6	15 28.9	69.0	40
30	13 17.7	73.2	14 08.9	72.7	14 59.8	72.1	15 50.7	71.6	16 41.6	71.0	30
20	14 32.2	75.3	15 23.0	74.7	16 13.7	74.2	17 04.3	73.6	17 54.8	73.0	20
10	15 47.2	77.3	16 37.9	76.8	17 28.5	76.2	18 18.9	75.6	19 09.3	75.1	10
6 00	17 02.9	79.4	17 53.4	78.8	18 43.8	78.3	19 34.1	77.7	20 24.3	77.1	6 00
5 50	18 19.1	81.5	19 09.4	80.9	19 59.6	80.3	20 49.8	79.7	21 39.9	79.1	5 50
40	19 35.6	83.6	20 25.9	83.0	21 16.1	82.4	22 06.1	81.8	22 56.0	81.2	40
30	20 52.4	85.7	21 42.7	85.1	22 32.8	84.5	23 22.7	83.9	24 12.5	83.3	30
20	22 09.7	87.8	22 59.8	87.2	23 49.8	86.6	24 39.6	86.0	25 29.4	85.4	20
10	23 26.8	89.9	24 17.2	89.3	25 07.0	88.7	25 56.8	88.1	26 46.6	87.5	10
5 00	24 44.1	92.0	25 34.3	91.4	26 24.3	90.8	27 14.1	90.2	28 03.7	89.6	5 00
4 50	26 01.2	94.2	26 51.5	93.6	27 41.4	93.0	28 31.2	92.4	29 20.9	91.8	4 50
40	27 18.2	96.4	28 08.5	95.8	28 58.5	95.2	29 48.4	94.5	30 38.1	93.9	40
30	28 34.7	98.6	29 25.2	98.0	30 15.2	97.4	31 05.3	96.7	31 55.1	96.1	30
20	29 50.8	100.9	30 41.4	100.3	31 31.7	99.7	32 21.8	99.0	33 11.7	98.3	20
10	31 06.3	103.2	31 57.2	102.6	32 47.7	102.0	33 37.8	101.3	34 27.9	100.6	10
4 00	32 21.3	105.6	33 12.1	104.9	34 02.8	104.3	34 53.4	103.6	35 43.6	103.0	4 00
3 50	33 35.2	108.0	34 26.4	107.3	35 17.2	106.7	36 08.0	106.0	36 58.5	105.3	3 50
40	34 48.2	110.4	35 39.5	109.7	36 30.7	109.1	37 21.7	108.4	38 12.4	107.8	40
30	36 00.0	112.9	36 51.8	112.2	37 43.2	111.6	38 34.5	110.9	39 25.6	110.3	30
20	37 10.5	115.4	38 02.5	114.8	38 54.4	114.1	39 46.0	113.5	40 37.4	112.8	20
10	38 19.6	118.0	39 12.1	117.4	40 04.2	116.7	40 56.2	116.1	41 48.0	115.4	10
3 00	39 26.9	120.6	40 19.7	120.0	41 12.4	119.4	42 04.8	118.7	42 57.0	118.1	3 00
2 50	40 32.5	123.3	41 25.7	122.7	42 18.7	122.1	43 11.6	121.5	44 04.2	120.8	2 50
40	41 36.0	126.1	42 29.7	125.5	43 23.2	124.9	44 16.5	124.3	45 09.6	123.6	40
30	42 37.2	129.0	43 31.4	128.4	44 25.4	127.8	45 19.2	127.2	46 12.9	126.5	30
20	43 36.0	131.9	44 30.6	131.3	45 25.2	130.8	46 19.5	130.1	47 13.7	129.5	20
10	44 32.1	134.9	45 27.4	134.3	46 22.3	133.8	47 17.3	133.2	48 11.9	132.6	10
2 00	45 25.3	138.0	46 21.1	137.4	47 16.7	136.9	48 12.1	136.3	49 07.4	135.7	2 00
1 50	46 15.4	141.1	47 11.7	140.6	48 07.9	140.1	49 03.9	139.6	49 59.7	139.0	1 50
40	47 02.2	144.4	47 59.0	143.9	48 55.7	143.4	49 52.3	142.9	50 48.8	142.4	40
30	47 45.4	147.7	48 42.8	147.2	49 39.9	146.8	50 37.0	146.3	51 34.0	145.8	30
20	48 24.8	151.0	49 22.6	150.6	50 20.4	150.2	51 18.0	149.8	52 15.5	149.3	20
10	49 00.2	154.5	49 58.5	154.1	50 56.7	153.7	51 54.8	153.3	52 52.9	152.9	10
1 00	49 31.3	158.0	50 30.0	157.7	51 28.6	157.3	52 27.3	157.0	53 25.8	156.6	1 00
0 50	49 58.0	161.6	50 57.1	161.3	51 56.1	161.0	52 55.1	160.7	53 54.1	160.4	0 50
40	50 20.1	165.2	51 19.5	165.0	52 18.9	164.7	53 18.3	164.5	54 17.6	164.2	40
30	50 37.4	168.9	51 37.1	168.7	52 36.8	168.4	53 36.4	168.3	54 36.1	168.1	30
20	50 50.0	172.6	51 49.8	172.4	52 49.6	172.3	53 49.5	172.2	54 49.3	172.0	20
10	50 57.5	176.3	51 57.5	176.2	52 57.4	176.1	53 57.4	176.1	54 57.4	176.0	10
0 00	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 17.3	92.1	0 25.8	92.7							5 50
40	2 34.4	94.3	1 42.9	94.8	0 51.4	95.3					40
30	3 51.3	96.4	2 59.8	96.9	2 08.1	97.4	1 16.6	97.9	0 25.0	98.5	30
20	5 07.9	98.6	4 16.3	99.1	3 24.5	99.6	2 32.9	100.1	1 41.2	100.6	20
10	6 24.0	100.7	5 32.3	101.3	4 40.4	101.8	3 48.7	102.3	2 56.9	102.8	10
5 00	7 39.6	102.9	6 47.7	103.4	5 55.8	104.0	5 03.8	104.5	4 11.8	105.0	5 00
4 50	8 54.6	105.1	8 02.4	105.6	7 10.4	106.1	6 18.3	106.6	5 26.1	107.1	4 50
40	10 08.7	107.3	9 16.5	107.8	8 24.1	108.3	7 31.8	108.8	6 39.5	109.3	40
30	11 22.1	109.5	10 29.5	110.0	9 36.9	110.5	8 44.5	111.0	7 51.8	111.5	30
20	12 34.3	111.8	11 41.7	112.3	10 48.8	112.8	9 56.0	113.2	9 03.2	113.7	20
10	13 45.4	114.0	12 52.5	114.5	11 59.4	115.0	11 06.4	115.5	10 13.2	115.9	10
4 00	14 55.4	116.3	14 02.1	116.8	13 08.9	117.3	12 15.5	117.8	11 22.1	118.2	4 00
3 50	16 03.9	118.6	15 10.3	119.1	14 16.8	119.6	13 23.1	120.0	12 29.4	120.5	3 50
40	17 11.0	121.0	16 17.1	121.4	15 23.2	121.9	14 29.2	122.3	13 35.2	122.8	40
30	18 16.3	123.3	17 22.1	123.8	16 27.9	124.2	15 33.7	124.7	14 39.2	125.1	30
20	19 20.0	125.7	18 25.5	126.2	17 30.9	126.6	16 36.2	127.1	15 41.5	127.5	20
10	20 21.8	128.1	19 26.8	128.6	18 31.9	129.0	17 36.9	129.4	16 41.8	129.8	10
3 00	21 21.5	130.6	20 26.2	131.0	19 30.9	131.4	18 35.6	131.8	17 40.1	32.22	3 00
2 50	22 18.9	133.1	21 23.4	133.5	20 27.6	133.9	19 32.0	134.3	18 36.2	134.6	2 50
40	23 14.2	135.6	22 18.3	136.0	21 22.2	136.4	20 26.1	136.8	19 30.0	137.1	40
30	24 07.0	138.2	23 10.7	138.5	22 14.2	138.9	21 17.8	139.3	20 21.2	139.6	30
20	24 57.3	140.8	24 00.5	141.1	23 03.7	141.5	22 06.8	141.8	21 09.9	142.2	20
10	25 44.7	143.4	24 47.7	143.7	23 50.4	144.1	22 53.3	144.4	21 56.1	144.7	10
2 00	26 29.4	146.0	25 21.9	146.3	24 34.4	146.7	23 36.8	147.0	22 39.2	147.3	2 00
1 50	27 11.0	148.7	26 13.3	149.0	25 15.2	149.3	24 17.4	149.6	23 19.6	149.9	1 50
40	27 49.6	151.5	26 51.4	151.7	25 53.2	152.0	24 55.0	152.3	23 56.7	152.6	40
30	28 24.8	154.2	27 26.3	154.4	26 27.8	154.7	25 29.2	155.0	24 30.8	155.2	30
20	28 56.7	157.0	27 57.9	157.2	26 59.1	157.4	26 00.3	157.7	25 01.5	157.9	20
10	29 25.1	159.8	28 26.1	160.0	27 27.0	160.2	26 28.0	160.4	25 28.9	160.6	10
1 00	29 50.0	162.6	28 50.8	162.8	27 51.4	163.0	26 52.1	163.2	25 52.8	163.3	1 00
0 50	30 11.2	165.5	29 11.8	165.7	28 12.2	165.8	27 12.7	165.9	26 13.2	166.0	0 50
40	30 28.7	168.4	29 29.0	168.5	28 29.4	168.6	27 29.7	168.7	26 29.9	168.8	40
30	30 42.4	171.3	29 42.5	171.3	28 42.7	171.4	27 42.9	171.5	26 43.1	171.6	30
20	30 52.1	174.2	29 52.2	174.2	28 52.3	174.3	27 52.3	174.3	26 52.4	174.4	20
10	30 58.0	177.1	29 58.1	177.1	28 58.1	177.1	27 58.2	177.1	26 58.2	177.2	10
0 00	31 0.0	180.0	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 49.5	101.1		101.7							5 20
10	2 05.0	103.3	1 13.2	103.8	0 21.3	104.3					10
5 00	3 19.8	105.5	2 27.8	106.0	1 35.8	106.5	0 43.7	107.0			5 00
4 50	4 33.9	107.6	3 41.6	108.1	2 49.3	108.6	1 57.2	109.1	1 05.0	109.6	4 50
40	5 47.1	109.8	4 54.7	110.3	4 02.2	110.8	3 09.7	111.3	2 17.2	111.7	40
30	6 59.2	112.0	6 06.6	112.5	5 13.8	112.9	4 21.1	113.4	3 28.1	113.9	30
20	8 10.3	114.2	7 17.4	114.7	6 24.4	115.1	5 31.4	115.6	4 38.4	116.1	20
10	9 20.2	116.4	8 26.9	116.9	7 33.6	117.4	6 40.4	117.9	5 47.1	118.3	10
4 00	10 28.7	118.7	9 35.2	119.1	8 41.6	119.6	7 48.0	120.1	6 54.4	120.5	4 00
3 50	11 35.7	121.0	10 41.8	121.4	9 48.0	121.8	8 54.1	122.3	8 00.1	122.7	3 50
40	12 41.1	123.3	11 47.0	123.7	10 52.8	124.1	9 58.6	124.6	9 04.5	125.0	40
30	13 44.8	125.6	12 50.4	126.0	11 55.9	126.4	11 01.4	126.9	10 06.7	127.3	30
20	14 46.8	127.9	13 52.0	128.3	12 57.1	128.7	12 02.2	129.2	11 07.3	129.6	20
10	15 46.8	130.2	14 51.6	130.6	13 56.4	131.0	13 01.1	131.5	12 05.8	131.9	10
3 00	16 44.7	132.6	15 49.1	133.0	14 53.6	133.4	13 58.0	133.8	13 2.4	134.2	3 00
2 50	17 40.4	135.0	16 44.4	135.4	15 48.6	135.8	14 52.6	136.2	13 56.6	136.6	2 50
40	18 33.8	137.5	17 37.5	137.9	16 41.2	138.2	15 44.9	138.6	14 48.5	139.0	40
30	19 24.8	140.0	18 28.1	140.3	17 31.4	140.7	16 34.8	141.0	15 38.0	141.4	30
20	20 13.0	142.5	19 16.1	142.8	18 19.1	143.2	17 22.0	143.5	16 25.0	143.8	20
10	20 58.8	145.0	20 01.4	145.3	19 04.1	145.7	18 06.6	146.0	17 09.2	146.3	10
2 00	21 41.6	147.6	20 44.0	147.9	19 46.3	148.2	18 48.5	148.5	17 50.8	148.8	2 00
1 50	22 21.6	150.2	21 23.6	150.5	20 25.5	150.7	19 27.5	151.0	18 29.4	151.3	1 50
40	22 58.4	152.8	22 00.1	153.1	21 01.8	153.3	20 03.4	153.6	19 05.0	153.8	40
30	23 32.2	155.4	22 33.5	155.7	21 34.9	155.9	20 36.3	156.1	19 37.6	156.3	30
20	24 02.6	158.1	23 03.7	158.3	22 04.8	158.5	21 05.9	158.7	20 07.0	158.9	20
10	24 29.8	160.8	23 30.7	161.0	22 31.5	161.1	21 32.4	161.3	20 33.1	161.5	10
1 00	24 53.4	163.5	23 54.1	163.7	22 54.7	163.8	21 55.4	164.0	20 56.0	164.1	1 00
0 50	25 13.7	166.2	24 14.1	166.4	23 14.5	166.5	22 15.1	166.6	21 15.4	166.7	0 50
40	25 30.3	169.0	24 30.6	169.1	23 30.9	169.2	22 31.2	169.3	21 31.5	169.4	40
30	25 43 3	171.7	24 43.4	171.8	23 43.6	171.9	22 43.8	171.9	21 43.8	172.0	30
20	25 52.5	174.5	24 52.6	174.5	23 52.7	174.6	22 52.8	174.6	21 52.9	174.7	20
10	25 58.2	177.2	24 58.2	177.2	23 58.2	177.3	22 58.2	177.3	21 58.2	177.3	10
0 00	26 0.0	180.0	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 50	0 12.6	110.1									4 50
40	1 24.7	112.2	0 32.2	112.7							40
30	2 35.6	114.4	1 42.9	114.9	0 50.1	115.3					30
20	3 45.4	116.6	2 52.4	117.0	1 59.4	117.5	1 06.3	118.0	0 13.2	118.4	20
10	4 53.7	118.8	4 00.4	119.2	3 07.1	119.7	2 13.8	120.1	1 20.4	120.6	10
4 00	6 00.8	121.0	5 07.2	121.4	4 13.6	121.9	3 19.9	122.3	2 26.2	122.8	4 00
3 50	7 06.3	123.2	6 12.4	123.6	5 18.3	124.1	4 24.4	124.5	3 30.3	124.9	3 50
40	8 10.2	125.4	7 15.9	125.8	6 21.5	126.3	5 27.2	126.7	4 32.8	127.1	40
30	9 12.1	127.7	8 17.5	128.1	7 22.8	128.5	6 28.1	128.9	5 33.5	129.3	30
20	10 12.4	130.0	9 17.4	130.4	8 22.4	130.8	7 27.4	131.2	6 32.3	131.6	20
10	11 10.5	132.3	10 15.4	132.7	9 19.8	133.1	8 24.5	133.4	7 29.1	133.8	10
3 00	12 06.7	134.6	11 11.1	135.0	10 15.3	135.4	9 19.5	135.7	8 23.8	136.1	3 00
2 50	13 00.6	136.9	12 04.5	137.3	11 08.4	137.7	10 12.3	138.0	9 16.1	138.4	2 50
40	13 52.2	139.3	12 55.8	139.7	11 59.3	140.0	11 02.8	140.3	10 06.3	140.7	40
30	14 41.3	141.7	13 44.5	142.0	12 47.7	142.4	11 50.9	142.7	10 54.0	143.0	30
20	15 28.0	144.1	14 30.8	144.4	13 33.6	144.8	12 36.5	145.1	11 39.3	145.4	20
10	16 11.7	146.5	15 14.3	146.8	14 16.8	147.2	13 19.4	147.5	12 21.8	147.7	10
2 00	16 53.0	149.0	15 55.2	149.3	14 57.4	149.6	13 59.5	149.9	13 01.7	150.1	2 00
1 50	17 31.2	151.5	16 33.1	151.8	15 35.0	152.0	14 36.9	152.3	13 38.8	152.5	1 50
40	18 06.6	154.0	17 08.2	154.3	16 09.8	154.5	15 11.3	154.8	14 12.8	155.0	40
30	18 38.8	156.5	17 40.2	156.8	16 41.5	157.0	15 42.8	157.2	14 44.1	157.4	30
20	19 08.1	159.1	18 09.1	159.3	17 10.2	159.5	16 11.2	159.7	15 12.2	159.9	20
10	19 33.9	161.7	18 34.8	161.9	17 35.5	162.0	16 36.4	162.2	15 37.1	162.4	10
1 00	19 56.6	164.3	18 57.2	164.4	17 57.8	164.6	16 58.4	164.7	15 58.9	164.9	1 00
0 50	20 15.8	166.9	19 16.3	167.0	18 16.6	167.1	17 17.1	167.2	16 17.6	167.4	0 50
40	20 31.7	169.5	19 32.0	169.6	18 32.2	169.7	17 32.5	169.8	16 32.8	169.9	40
30	20 44.0	172.1	19 44.2	172.2	18 44.3	172.2	17 44.6	172.3	16 44.7	172.4	30
20	20 52.9	174.7	19 53.0	174.8	18 53.1	174.8	17 53.2	174.9	16 53.2	174.9	20
10	20 58.2	177.3	19 58.2	177.4	18 58.2	177.4	17 58.2	177.4	16 58.3	177.4	10
0 00	21 0.0	180.0	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 10	0 27.0	121.1									4 10
4 00	1 32.5	123.2	0 38.8	123.6							4 00
3 50	2 36.3	125.4	1 42.3	125.8	0 48.1	126.2					3 50
40	3 38.5	127.6	2 44.0	128.0	1 49.7	128.4	0 55.3	128.8	0 00.9	129.2	40
30	4 38.8	129.8	3 44.0	130.2	2 49.2	130.6	1 54.6	131.0	0 59.8	131.4	30
20	5 37.2	132.0	4 42.1	132.4	3 47.0	132.8	2 51.9	133.2	1 56.8	133.6	20
10	6 33.7	134.2	5 38.1	134.6	4 42.8	135.0	3 47.4	135.4	2 51.7	135.7	10
3 00	7 27.9	136.5	6 32.0	136.8	5 36.3	137.2	4 40.4	137.6	3 44.6	137.9	3 00
2 50	8 20.0	138.8	7 23.8	139.1	6 27.7	139.4	5 31.4	139.8	4 35.2	140.1	2 50
40	9 09.8	141.1	8 13.2	141.4	7 16.7	141.7	6 20.1	142.1	5 23.5	142.4	40
30	9 57.1	143.3	9 00.2	143.7	8 03.4	144.0	7 06.5	144.3	6 09.5	144.6	30
20	10 42.0	145.7	9 44.8	146.0	8 47.5	146.3	7 50.3	146.6	6 53.0	146.9	20
10	11 24.2	148.0	10 26.7	148.3	9 29.1	148.6	8 31.6	148.9	7 33.9	149.2	10
2 00	12 03.8	150.4	11 05.9	150.7	10 08.0	150.9	9 10.0	151.1	8 12.1	151.5	2 00
1 50	12 40.6	152.8	11 42.3	153.0	10 44.1	153.3	9 45.9	153.5	8 47.7	153.8	1 50
40	13 14.3	155.2	12 15.9	155.4	11 17.4	155.7	10 18.8	155.9	9 20.3	156.1	40
30	13 45.3	157.6	12 46.6	157.8	11 47.8	158.0	10 49.1	158.2	9 50.2	158.4	30
20	14 13.1	160.1	13 14.1	160.3	12 15.2	160.4	11 16.1	160.6	10 17.1	160.8	20
10	14 37.9	162.5	13 38.7	162.7	12 39.5	162.8	11 40.2	163.0	10 41.0	163.2	10
1 00	14 59.5	165.0	14 00.1	165.1	13 00.6	165.3	12 01.2	165.4	11 01.8	165.6	1 00
0 50	15 17.9	167.5	14 18.4	167.6	13 18.7	167.7	12 19.1	167.8	11 19.5	167.9	0 50
40	15 33.0	170.0	14 33.2	170.1	13 33.5	170.2	12 33.8	170.3	11 34.1	170.4	40
30	15 44.8	172.5	14 44.9	172.5	13 45.1	172.6	12 45.2	172.7	11 45.4	172.8	30
20	15 53.2	175.0	14 53.2	175.0	13 53.3	175.1	12 53.4	175.1	11 53.5	175.2	20
10	15 58.3	177.5	14 58.3	177.5	13 58.3	177.5	12 58.4	177.5	11 58.4	177.6	10
0 00	16 0.0	180.0	15 0.0	180.0	14 0.0	180.0	13 0.0	180.0	12 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 30	0 04.9	131.8									3 30
20	1 01.7	134.0	0 06.5	134.4							20
10	1 56.2	136.1	1 00.7	136.5	0 05.2	136.9					10
3 00	2 48.8	138.3	1 52.9	138.7	0 57.0	139.0	0 01.1	139.4			3 00
2 50	3 39.0	140.5	2 42.7	140.9	1 46.5	141.2	0 50.2	141.6			2 50
40	4 27.0	142.7	3 30.4	143.0	2 33.8	143.3	1 37.2	143.7	0 40.0	144.0	40
30	5 12.5	144.9	4 15.6	145.3	3 18.7	145.6	2 21.7	145.9	1 24.7	146.2	30
20	5 55.7	147.2	4 58.4	147.5	4 01.1	147.8	3 03.8	148.1	2 06.4	148.4	20
10	6 36.2	149.4	5 38.6	149.7	4 41.0	150.0	3 43.4	150.3	2 45.8	150.6	10
2 00	7 14.2	151.7	6 16.2	152.0	5 18.3	152.3	4 20.3	152.5	3 22.4	152.8	2 00
1 50	7 49.3	154.0	6 51.1	154.3	5 52.9	154.5	4 54.7	154.7	3 56.4	155.0	1 50
40	8 21.9	156.3	7 23.3	156.6	6 24.8	156.8	5 26.3	157.0	4 27.7	157.2	40
30	8 51.4	158.6	7 52.6	158.9	6 53.8	159.1	5 55.0	159.2	4 56.2	159.4	30
20	9 18.1	161.0	8 19.0	161.2	7 20.0	161.4	6 20.9	161.5	5 21.9	161.7	20
10	9 41.7	163.3	8 42.4	163.5	7 43.2	163.7	6 44.0	163.8	5 44.6	164.0	10
1 00	10 02.4	165.7	9 02.9	165.8	8 03.4	166.0	7 03.9	166.1	6 04.5	166.5	1 00
0 50	10 19.8	168.0	9 20.2	168.2	8 20.7	168.3	7 21.0	168.4	6 21.3	168.5	0 50
40	10 34.3	170.4	9 34.5	170.5	8 34.8	170.6	7 35.0	170.7	6 35.3	170.8	40
30	10 45.4	172.8	9 45.6	172.9	8 45.8	172.9	7 45.9	173.0	6 46.1	173.1	30
20	10 53.6	175.2	9 53.7	175.3	8 53.7	175.3	7 53.8	175.3	6 53.8	175.4	20
10	10 58.4	177.6	9 58.4	177.6	8 58.4	177.6	7 58.4	177.7	6 58.4	177.7	10
0 00	11 0.0	180.0	10 0.0	180.0	9 0.0	180.0	8 0.0	180.0	7 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 20							0 06.2	84.2	0 58.3	83.7	6 20
10					0 28.9	86.8	1 20.9	86.3	2 13.0	85.8	10
6 00	0 00.0	90.0	0 52.0	89.5	1 43.9	89.0	2 35.9	88.5	3 27.8	88.0	6 00
5 50	1 15.0	92.1	2 06.9	91.7	2 58.8	91.2	3 50.9	90.7	4 42.8	90.1	5 50
40	2 29.9	94.3	3 21.9	93.8	4 13.8	93.3	5 05.8	92.8	5 57.8	92.3	40
30	3 44.5	96.5	4 36.6	96.0	5 28.5	95.5	6 20.6	95.0	7 12.7	94.5	30
20	4 58.9	98.7	5 51.0	98.2	6 43.1	97.7	7 35.2	97.2	8 27.3	96.7	20
10	6 12.8	100.9	7 05.0	100.4	7 57.2	99.9	8 49.4	99.4	9 41.6	98.9	10
5 00	7 26.1	103.1	8 18.5	102.6	9 10.9	102.1	10 03.2	101.6	10 55.5	101.1	5 00
4 50	8 38.9	105.3	9 31.4	104.8	10 23.9	104.3	11 16.4	103.8	12 08.8	103.3	4 50
40	9 50.9	107.5	10 43.5	107.0	11 36.1	106.5	12 28.8	106.0	13 21.4	105.5	40
30	11 01.9	109.7	11 54.8	109.2	12 47.6	108.7	13 40.5	108.3	14 33.2	107.8	30
20	12 12.0	112.0	13 05.1	111.5	13 58.1	111.0	14 51.2	110.6	15 44.2	110.1	20
10	13 20.9	114.3	14 14.2	113.8	15 07.6	113.3	16 00.9	112.9	16 54.1	112.4	10
4 00	14 28.6	116.6	15 22.3	116.1	16 16.0	115.6	17 09.5	115.2	18 02.9	114.7	4 00
3 50	15 35.0	118.9	16 28.9	118.4	17 22.8	117.9	18 16.6	117.5	19 10.4	117.0	3 50
40	16 39.9	121.2	17 34.2	120.8	18 28.4	120.3	19 22.4	119.9	20 16.4	119.4	40
30	17 43.2	123.6	18 37.8	123.2	19 32.2	122.7	20 26.7	122.3	21 21.0	121.8	30
20	18 44.9	126.0	19 39.7	125.6	20 34.5	125.1	21 29.4	124.7	22 23.8	124.3	20
10	19 44.6	128.4	20 39.8	128.0	21 34.9	127.6	22 29.9	127.2	23 24.9	126.7	10
3 00	20 42.2	130.9	21 37.8	130.5	22 33.3	130.1	23 28.7	129.7	24 24.0	129.2	3 00
2 50	21 37.9	133.4	22 33.8	133.0	23 29.6	132.6	24 25.3	132.2	25 21.1	131.8	2 50
40	22 31.3	135.9	23 27.5	135.5	24 23.7	135.1	25 19.8	134.8	26 15.8	134.4	40
30	23 22.2	138.4	24 18.8	138.1	25 15.3	137.7	26 11.8	137.4	27 08.2	137.0	30
20	24 10.7	141.0	25 07.6	140.7	26 04.5	140.3	27 01.4	140.0	27 58.2	139.6	20
10	24 56.5	143.6	25 53.8	143.3	26 51.0	143.0	27 48.2	142.7	28 45.4	142.3	10
2 00	25 39.5	146.3	26 37.2	146.0	27 34.8	145.7	28 32.3	145.4	29 29.8	145.0	2 00
1 50	26 19.6	149.0	27 17.7	148.7	28 15.6	148.4	29 13.4	148.1	30 11.2	147.8	1 50
40	26 56.8	151.7	27 55.1	151.4	28 53.3	151.2	29 51.5	150.9	30 49.7	150.6	40
30	27 30.7	154.4	28 29.3	154.2	29 27.8	154.0	30 26.4	153.7	31 24.9	153.4	30
20	28 01.5	157.2	29 00.3	157.0	29 59.1	156.8	30 57.9	156.5	31 56.7	156.3	20
10	28 28.8	160.0	29 27.9	159.8	30 27.1	159.6	31 26.2	159.4	32 25.2	159.2	10
1 00	28 52.7	162.8	29 52.1	162.6	30 51.4	162.5	31 50.7	162.3	32 50.0	162.1	1 00
0 50	29 13.1	165.6	30 12.7	165.5	31 12.2	165.4	32 11.7	165.2	33 11.2	165.0	0 50
40	29 29.9	168.5	30 29.6	168.4	31 29.3	168.3	32 29.0	168.1	33 28.7	168.0	40
30	29 43.0	171.3	30 42.8	171.3	31 42.7	171.2	32 42.5	171.1	33 42.4	171.0	30
20	29 52.5	174.2	30 52.4	174.2	31 52.2	174.1	32 52.2	174.1	33 52.1	174.0	20
10	29 58.1	177.1	30 58.1	177.1	31 58.1	177.0	32 58.0	177.0	33 58.0	177.0	10
0 00	30 0.0	180.0	31 0.0	180.0	32 0.0	180.0	33 0.0	180.0	34 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 00									0 26.4	72.6	7 00
6 50							0 45.9	75.2	1 38.2	74.7	6 50
40			0 14.4	78.4	1 06.6	77.9	1 58.8	77.4	2 51.0	76.9	40
30	0 36.0	81.0	1 28.0	80.5	2 20.2	80.0	3 12.2	79.5	4 04.4	79.0	30
20	1 50.3	83.2	2 42.3	82.7	3 34.3	82.2	4 26.2	81.7	5 18.2	81.2	20
10	3 04.9	85.3	3 56.8	84.8	4 48.8	84.3	5 40.7	83.8	6 32.6	83.3	10
6 00	4 19.8	87.5	5 11.7	87.0	6 03.5	86.5	6 55.3	86.0	7 47.2	85.5	6 00
5 50	5 34.8	89.6	6 26.6	89.1	7 18.5	88.6	8 10.3	88.1	9 02.1	87.6	5 50
40	6 49.7	91.8	7 41.6	91.3	8 33.4	90.8	9 25.2	90.3	10 17.0	89.8	40
30	8 04.6	94.0	8 56.5	93.5	9 48.4	93.0	10 40.2	92.5	11 32.0	92.0	30
20	9 19.3	96.2	10 11.3	95.7	11 03.2	95.2	11 55.1	94.7	12 46.9	94.2	20
10	10 33.8	98.4	11 25.8	97.9	12 17.8	97.4	13 19.7	96.8	14 01.6	96.3	10
5 00	11 47.7	100.6	12 39.8	100.1	13 31.9	99.6	14 24.0	99.1	15 16.0	98.5	5 00
4 50	13 01.1	102.8	13 53.3	102.3	14 45.6	101.8	15 37.7	101.3	16 29.9	100.8	4 50
40	14 13.9	105.0	15 06.4	104.5	15 58.7	104.0	16 51.0	103.5	17 43.3	103.0	40
30	15 25.9	107.3	16 18.6	106.8	17 11.2	106.3	18 03.6	105.8	18 56.0	105.3	30
20	16 37.1	109.6	17 30.0	109.1	18 22.7	108.6	19 15.3	108.1	20 07.9	107.6	20
10	17 47.2	111.9	18 40.2	111.4	19 33.2	110.9	20 26.2	110.4	21 19.0	109.9	10
4 00	18 56.3	114.2	19 49.6	113.7	20 42.8	113.2	21 35.9	112.7	22 28.9	112.2	4 00
3 50	20 04.0	116.5	20 57.6	116.1	21 51.1	115.6	22 44.4	115.1	23 37.8	114.6	3 50
40	21 10.4	118.9	22 04.3	118.5	22 58.0	118.0	23 51.7	117.5	24 45.3	117.0	40
30	22 15.2	121.3	23 09.4	120.9	24 03.5	120.4	24 57.4	119.9	25 51.3	119.4	30
20	23 18.4	123.8	24 13.0	123.4	25 07.3	122.9	26 01.6	122.4	26 55.8	121.9	20
10	24 19.8	126.3	25 14.6	125.9	26 09.4	125.4	27 04.1	124.9	27 58.7	124.4	10
3 00	25 19.3	128.8	26 14.5	128.4	27 09.5	127.9	28 04.5	127.5	28 59.4	127.0	3 00
2 50	26 16.7	131.4	27 12.2	131.0	28 07.7	130.5	29 03.0	130.1	29 58.3	129.6	2 50
40	27 11.8	134.0	28 07.7	133.6	29 03.5	133.1	29 59.3	132.7	30 55.0	132.3	40
30	28 04.6	136.6	29 00.8	136.2	29 57.1	135.8	30 53.2	135.4	31 49.3	135.0	30
20	28 54.9	139.2	29 51.5	138.9	30 48.0	138.5	31 44.5	138.1	32 41.0	137.7	20
10	29 42.5	141.9	30 39.3	141.6	31 36.5	141.2	32 33.3	140.9	33 30.2	140.5	10
2 00	30 27.3	144.7	31 24.7	144.4	32 22.0	144.0	33 19.2	143.7	34 16.4	143.3	2 00
1 50	31 09.1	147.5	32 06.8	147.2	33 04.5	146.9	34 02.2	146.5	34 59.8	146.2	1 50
40	31 47.9	150.3	32 46.0	150.0	33 44.0	149.7	34 42.0	149.4	35 40.0	149.1	40
30	32 23.3	153.2	33 21.7	152.9	34 20.2	152.6	35 18.5	152.3	36 16.8	152.0	30
20	32 55.5	156.1	33 54.3	155.8	34 52.9	155.6	35 51.5	155.3	36 50.2	155.0	20
10	33 24.2	159.0	34 23.2	158.7	35 22.1	158.5	36 21.1	158.3	37 20.0	158.1	10
1 00	33 49.3	161.9	34 48.6	161.7	35 47.8	161.5	36 47.0	161.3	37 46.2	161.1	1 00
0 50	34 10.7	164.9	35 10.1	164.7	36 09.7	164.6	37 09.1	164.4	38 08.6	164.2	0 50
40	34 28.4	167.9	35 28.0	167.8	36 27.6	167.6	37 27.2	167.5	38 26.9	167.4	40
30	34 42.2	170.9	35 41.9	170.8	36 41.8	170.7	37 41.5	170.6	38 41.4	170.5	30
20	34 52.1	173.9	35 52.0	173.9	36 51.9	173.8	37 51.8	173.7	38 51.7	173.6	20
10	34 58.0	176.9	35 57.9	176.9	36 57.9	176.9	37 57.9	176.8	38 57.9	176.8	10
0 00	35 0.0	180.0	36 0.0	180.0	37 0.0	180.0	38 0.0	180.0	39 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
7 40									0 15.4	61.6	7 40
30							0 28.9	64.2	1 22.0	63.7	30
20					0 44.0	66.8	1 37.0	66.3	2 29.9	65.9	20
10	0 07.9	69.9	1 00.7	69.5	1 53.5	68.9	2 46.1	68.4	3 38.9	68.0	10
7 00	1 18.9	72.1	2 11.4	71.6	3 04.0	71.1	3 56.5	70.6	4 49.0	70.2	7 00
6 50	2 30.7	74.2	3 22.9	73.8	4 15.4	73.3	5 07.7	72.8	6 00.0	72.3	6 50
40	3 43.2	76.4	4 35.4	75.9	5 27.6	75.4	6 19.7	74.9	7 11.8	74.4	40
30	4 56.4	78.5	5 48.4	78.0	6 40.4	77.5	7 32.5	77.0	8 24.4	76.5	30
20	6 10.1	80.7	7 02.1	80.2	7 54.0	79.7	8 45.8	79.2	9 37.6	78.6	20
10	7 24.3	82.8	8 16.2	82.3	9 08.0	81.8	9 59.7	81.3	10 51.4	80.8	10
6 00	8 39.0	85.0	9 30.7	84.5	10 22.4	83.9	11 14.1	83.4	12 05.7	82.9	6 00
5 50	9 53.8	87.1	10 45.5	86.6	11 37.1	86.0	12 28.8	85.5	13 20.3	85.0	5 50
40	11 08.7	89.3	12 00.4	88.8	12 52.0	88.2	13 43.6	87.7	14 35.1	87.2	40
30	12 23.7	91.4	13 15.3	90.9	14 07.0	90.4	14 58.5	89.9	15 50.0	89.3	30
20	13 38.6	93.6	14 30.3	93.1	15 22.0	92.6	16 13.5	92.1	17 05.0	91.5	20
10	14 53.4	95.8	15 45.1	95.3	16 36.8	94.8	17 28.4	94.3	18 20.0	93.7	10
5 00	16 07.9	98.0	16 59.7	97.5	17 51.4	97.0	18 43.1	96.4	19 34.7	95.9	5 00
4 50	17 21.9	100.2	18 13.8	99.7	19 05.7	99.2	19 57.4	98.6	20 49.1	98.1	4 50
40	18 35.5	102.5	19 27.5	102.0	20 19.5	101.4	21 11.3	100.9	22 03.1	100.3	40
30	19 48.3	104.7	20 40.5	104.2	21 32.7	103.7	22 24.7	103.1	23 16.7	102.6	30
20	21 00.5	107.0	21 52.9	106.5	22 45.2	106.0	23 37.4	105.4	24 29.5	104.9	20
10	22 11.6	109.3	23 04.3	108.8	23 56.8	108.3	24 49.2	107.7	25 41.5	107.2	10
4 00	23 21.9	111.7	24 14.8	111.2	25 07.6	110.7	26 00.2	110.1	26 52.7	109.6	4 00
3 50	24 30.9	114.1	25 24.1	113.6	26 17.1	113.1	27 10.0	112.5	28 02.8	112.0	3 50
40	25 38.8	116.5	26 32.2	116.0	27 25.6	115.5	28 18.7	115.0	29 11.7	114.4	40
30	26 45.2	119.0	27 38.9	118.5	28 32.5	118.0	29 25.9	117.5	30 19.3	116.9	30
20	27 50.0	121.5	28 44.0	121.0	29 38.0	120.5	30 31.7	120.0	31 25.4	119.4	20
10	28 53.1	124.0	29 47.5	123.5	30 41.8	123.0	31 35.9	122.5	32 29.9	122.0	10
3 00	29 54.3	126.6	30 49.1	126.1	31 43.8	125.6	32 38.3	125.1	33 32.7	124.6	3 00
2 50	30 53.5	129.2	31 48.6	128.7	32 43.8	128.2	33 38.5	127.8	34 33.3	127.3	2 50
40	31 50.7	131.8	32 46.1	131.4	33 41.5	130.9	34 36.8	130.5	35 32.0	130.0	40
30	32 45.2	134.5	33 41.2	134.1	34 37.0	133.7	35 32.6	133.2	36 28.1	132.8	30
20	33 37.5	137.3	34 33.8	136.9	35 30.0	136.5	36 26.1	136.0	37 22.1	135.6	20
10	34 26.9	140.1	35 23.7	139.7	36 20.2	139.3	37 16.8	138.9	38 13.1	138.5	10
2 00	35 13.6	142.9	36 10.7	142.6	37 07.8	142.2	38 04.7	141.8	39 01.5	141.4	2 00
1 50	35 57.2	145.8	36 54.8	145.5	37 52.2	145.1	38 49.5	144.7	39 46.8	144.3	1 50
40	36 37.9	148.8	37 35.7	148.4	38 33.5	148.1	39 31.2	147.7	40 28.9	147.4	40
30	37 15.0	151.7	38 13.2	151.4	39 11.5	151.1	40 09.5	150.8	41 07.6	150.5	30
20	37 48.8	154.8	38 47.4	154.5	39 46.0	154.2	40 44.5	153.9	41 42.9	153.6	20
10	38 19.0	157.8	39 17.8	157.6	40 16.7	157.3	41 15.5	157.1	42 14.2	156.8	10
1 00	38 45.4	160.9	39 44.6	160.7	40 43.7	160.5	41 42.8	160.3	42 41.9	160.0	1 00
0 50	39 07.8	164.0	40 07.3	163.9	41 06.8	163.7	42 06.1	163.5	43 05.5	163.3	0 50
40	39 26.6	167.2	40 26.2	167.1	41 25.8	166.9	42 25.4	166.8	43 25.0	166.6	40
30	39 41.1	170.4	40 40.9	170.3	41 40.8	170.1	42 40.5	170.0	43 40.1	169.9	30
20	39 51.6	173.6	40 51.5	173.5	41 51.4	173.4	42 51.3	173.3	43 51.2	173.3	20
10	39 57.9	176.8	40 57.9	176.7	41 57.9	176.7	42 57.8	176.7	43 57.8	176.6	10
0 00	40 0.0	180.0	41 0.0	180.0	42 0.0	180.0	43 0.0	180.0	44 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00					0 48.5	55.9	1 42.6	55.5	2 36.7	55.1	8 00
7 50	0 03.9	59.0	0 57.7	58.5	1 51.5	58.1	2 45.1	57.6	3 38.9	57.2	7 50
40	1 08.9	61.1	2 02.3	60.7	2 55.8	60.2	3 49.3	59.8	4 42.8	59.3	40
30	2 15.1	63.3	3 08.3	62.8	4 01.6	62.4	4 54.8	61.9	5 47.8	61.4	30
20	3 22.8	65.4	4 15.7	64.9	5 08.6	64.5	6 01.5	64.0	6 54.4	63.5	20
10	4 31.5	67.6	5 24.2	67.0	6 16.9	66.6	7 09.5	66.1	8 02.1	65.6	10
7 00	5 41.4	69.7	6 33.8	69.2	7 26.2	68.7	8 18.6	68.2	9 11.0	67.7	7 00
6 50	6 52.1	71.8	7 44.4	71.3	8 36.6	70.8	9 28.8	70.3	10 20.8	69.8	6 50
40	8 03.9	73.9	8 55.9	73.4	9 47.9	72.9	10 39.8	72.4	11 31.7	71.9	40
30	9 16.3	76.0	10 08.1	75.5	11 00.0	75.0	11 51.7	74.5	12 43.3	74.0	30
20	10 29.3	78.1	11 21.0	77.6	12 12.7	77.1	13 04.3	76.6	13 55.8	76.1	20
10	11 42.9	80.2	12 34.6	79.7	13 26.1	79.2	14 17.6	78.8	15 08.9	78.1	10
6 00	12 57.2	82.4	13 48.6	81.9	14 40.0	81.3	15 31.3	80.8	16 22.5	80.2	6 00
5 50	14 11.7	84.5	15 03.1	84.0	15 54.4	83.4	16 45.5	82.9	17 36.7	82.3	5 50
40	15 26.4	86.6	16 17.7	86.1	17 08.9	85.6	18 00.1	85.0	18 51.2	84.5	40
30	16 41.4	88.8	17 32.7	88.2	18 23.8	87.7	19 14.9	87.1	20 05.9	86.6	30
20	17 56.3	91.0	18 47.6	90.4	19 38.8	89.9	20 30.0	89.3	21 20.9	88.7	20
10	19 11.2	93.1	20 02.6	92.6	20 53.8	92.0	21 44.9	91.5	22 35.9	90.9	10
5 00	20 26.1	95.3	21 17.4	94.8	22 08.7	94.2	22 59.9	93.7	23 50.9	93.1	5 00
4 50	21 40.7	97.5	22 32.1	97.0	23 23.4	96.4	24 14.6	95.9	25 05.6	95.3	4 50
40	22 54.7	99.8	23 46.3	99.2	24 37.7	98.7	25 29.0	98.1	26 20.2	97.5	40
30	24 08.3	102.1	25 00.1	101.5	25 51.7	100.9	26 43.0	100.4	27 34.3	99.8	30
20	25 21.4	104.4	26 13.2	103.8	27 04.9	103.2	27 56.6	102.7	28 48.0	102.1	20
10	26 33.7	106.7	27 25.7	106.1	28 17.6	105.5	29 09.3	105.0	30 00.9	104.4	10
4 00	27 45.0	109.1	28 37.3	108.5	29 29.4	107.9	30 21.4	107.4	31 13.2	106.8	4 00
3 50	28 55.4	111.5	29 47.9	110.9	30 40.3	110.3	31 32.5	109.8	32 24.5	109.2	3 50
40	30 04.5	113.9	30 57.3	113.3	31 49.9	112.8	32 42.5	112.2	33 34.8	111.6	40
30	31 12.4	116.4	32 05.6	115.8	32 58.6	115.3	33 51.3	114.7	34 43.9	114.1	30
20	32 18.9	118.9	33 12.3	118.4	34 05.6	117.8	34 58.8	117.2	35 51.7	116.7	20
10	33 23.8	121.5	34 17.6	121.0	35 11.1	120.4	36 04.6	119.8	36 57.9	119.3	10
3 00	34 26.9	124.1	35 21.0	123.6	36 14.9	123.0	37 08.8	122.5	38 02.5	121.9	3 00
2 50	35 28.1	126.8	36 22.5	126.3	37 16.9	125.7	38 11.1	125.2	39 05.2	124.6	2 50
40	36 27.0	129.5	37 21.9	129.0	38 16.7	128.5	39 11.4	127.9	40 05.9	127.4	40
30	37 23.7	132.3	38 19.1	131.8	39 14.3	131.3	40 09.4	130.7	41 04.2	130.2	30
20	38 17.9	135.1	39 13.7	134.6	40 09.4	134.1	41 05.0	133.6	42 00.4	133.1	20
10	38 09.5	138.0	40 05.8	137.5	41 01.9	137.1	41 57.9	136.6	42 53.7	136.1	10
2 00	39 58.2	140.9	40 54.9	140.5	41 51.4	140.1	42 47.9	139.6	43 44.2	139.1	2 00
1 50	40 43.9	143.9	41 41.1	143.5	42 38.1	143.1	43 35.1	142.7	44 31.7	142.2	1 50
40	41 26.5	147.0	42 24.0	146.6	43 21.4	146.2	44 18.8	145.8	45 16.1	145.4	40
30	42 05.6	150.1	43 03.7	149.8	44 01.5	149.4	44 59.1	149.0	45 56.9	148.6	30
20	42 41.2	153.3	43 39.5	153.0	44 37.8	152.6	45 36.0	152.3	46 34.1	151.9	20
10	43 12.9	156.5	44 11.7	156.2	45 10.3	155.9	46 09.1	155.6	47 07.4	155.3	10
1 00	43 40.9	159.8	44 39.9	159.5	45 38.9	159.3	46 37.9	159.0	47 36.8	158.7	1 00
0 50	44 04.8	163.1	45 04.1	162.9	46 03.4	162.7	47 02.6	162.4	48 01.8	162.2	0 50
40	44 24.5	166.4	45 24.0	166.3	46 23.5	166.1	47 23.0	165.9	48 22.5	165.7	40
30	44 39.8	169.7	45 39.7	169.7	46 39.5	169.5	47 39.1	169.4	48 38.8	169.2	30
20	44 51.1	173.1	45 50.9	173.1	46 50.8	173.0	47 50.6	172.9	48 50.5	172.8	20
10	44 57.8	176.5	45 57.8	176.5	46 57.8	176.5	47 57.7	176.4	48 57.7	176.4	10
0 00	45 0.0	180.0	46 0.0	180.0	47 0.0	180.0	48 0.0	180.0	49 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
8 00	3 30.8	54.6	4 24.9	54.2	5 18.9	53.8	6 13.0	53.3	5 10.7	52.9	8 00
7 50	4 32.7	56.7	5 26.5	56.3	6 20.2	55.8	7 13.8	55.4	8 07.0	54.9	7 50
40	5 36.2	58.8	6 29.6	58.4	7 23.0	57.9	8 16.3	57.5	9 09.6	57.0	40
30	6 41.0	60.9	7 34.1	60.5	8 27.2	60.0	9 20.3	59.5	10 13.3	59.0	30
20	7 47.2	63.0	8 40.0	62.6	9 32.8	62.1	10 25.6	61.6	11 18.3	61.1	20
10	8 54.7	65.1	9 47.2	64.6	10 39.7	64.1	11 32.1	63.6	12 24.6	63.1	10
7 00	10 03.3	67.2	10 55.6	66.7	11 47.8	66.1	12 39.9	65.7	13 32.0	65.2	7 00
6 50	11 12.9	69.3	12 04.9	68.8	12 56.9	68.2	13 48.8	67.7	14 40.7	67.2	6 50
40	12 23.5	71.3	13 15.3	70.8	14 07.0	70.3	14 58.6	69.8	15 50.3	69.2	40
30	13 35.0	73.4	14 26.6	72.9	15 18.2	72.3	16 09.6	71.8	17 01.0	71.3	30
20	14 47.3	75.5	15 38.7	75.0	26 30.0	74.4	17 21.0	73.9	18 12.0	73.3	20
10	16 00.2	77.6	16 51.5	77.1	17 42.6	76.5	18 33.6	76.0	19 24.6	75.4	10
6 00	17 13.7	79.7	18 04.8	79.1	18 55.8	78.6	19 46.7	78.0	20 37.5	77.5	6 00
5 50	18 27.7	81.8	19 18.7	81.2	20 09.6	80.7	21 00.3	80.1	21 51.0	79.5	5 50
40	19 42.2	83.9	20 33.1	83.3	21 23.9	82.8	22 14.5	82.2	23 05.0	81.6	40
30	20 56.8	86.0	21 47.7	85.4	22 38.4	84.9	23 29.0	84.3	24 19.3	83.7	30
20	22 11.8	88.2	23 02.5	87.6	23 53.1	87.0	24 43.6	86.4	25 34.0	85.8	20
10	23 26.7	90.3	24 17.5	89.7	25 08.2	89.1	25 58.6	88.5	26 48.9	87.9	10
5 00	24 41.7	92.5	25 32.4	91.9	26 23.1	91.3	27 13.6	90.7	28 03.9	90.1	5 00
4 50	25 56.6	94.7	26 47.4	94.1	27 38.0	93.5	28 28.5	92.9	29 18.8	92.3	4 50
40	27 11.2	96.9	28 02.1	96.3	28 52.8	95.7	29 43.3	95.1	30 33.7	94.5	40
30	28 25.4	99.2	29 16.4	98.6	30 07.3	98.0	30 57.9	97.3	31 48.3	96.7	30
20	29 39.2	101.5	30 30.3	100.9	31 21.3	100.3	32 12.1	99.6	33 02.7	99.0	20
10	30 52.4	103.8	31 43.7	103.2	32 34.8	102.6	33 25.8	101.9	34 16.5	101.3	10
4 00	32 04.8	106.2	32 56.3	105.6	33 47.7	104.9	34 38.8	104.3	35 29.7	103.7	4 00
3 50	33 16.4	108.6	34 08.2	108.0	34 59.7	107.3	35 51.1	106.7	36 42.2	106.0	3 50
40	34 27.0	111.0	35 18.9	110.4	36 10.7	109.8	37 02.3	109.2	37 53.8	108.5	40
30	35 36.4	113.5	36 28.7	112.9	37 20.9	112.3	38 12.7	111.7	39 04.4	111.0	30
20	36 44.5	116.1	37 37.1	115.5	38 29.5	114.9	39 21.7	114.2	40 13.8	113.6	20
10	37 51.1	118.7	38 44.0	118.1	39 36.9	117.5	40 29.5	116.9	41 21.8	116.3	10
3 00	38 56.0	121.3	39 49.4	120.7	40 42.6	120.1	41 35.6	119.5	42 28.4	118.9	3 00
2 50	39 59.2	124.0	40 53.0	123.5	41 46.6	122.9	42 40.0	122.3	43 33.2	121.7	2 50
40	41 0.3	126.8	41 54.5	126.3	42 48.5	125.7	43 42.3	125.1	44 36.0	124.5	40
30	41 59.1	129.7	42 53.8	129.2	43 48.4	128.6	44 42.6	128.0	45 36.8	127.4	30
20	42 55.6	132.6	43 50.7	132.1	44 45.7	131.5	45 40.5	130.9	46 35.2	130.3	20
10	43 49.5	135.6	44 45.1	135.1	45 40.7	134.5	46 35.9	134.0	47 31.0	133.4	10
2 00	44 40.5	138.6	45 36.6	138.1	46 32.6	137.6	47 28.4	137.1	48 24.1	136.6	2 00
1 50	45 28.6	141.8	46 25.1	141.3	47 21.7	140.8	48 18.0	140.3	49 14.2	139.8	1 50
40	46 13.3	145.0	47 10.3	144.5	48 07.3	144.1	49 04.2	143.6	50 01.0	143.1	40
30	46 54.5	148.3	47 52.1	147.8	48 49.7	147.4	49 47.0	146.9	50 44.2	146.5	30
20	47 32.1	151.6	48 30.1	151.2	49 28.1	150.8	50 25.9	150.4	51 23.7	150.0	20
10	48 05.9	155.0	49 04.4	154.6	50 02.7	154.3	51 01.1	153.9	51 59.3	153.6	10
1 00	48 35.6	158.4	49 34.3	158.1	50 33.1	157.8	51 31.9	157.5	52 30.6	157.2	1 00
0 50	49 01.0	161.9	50 00.2	161.7	50 59.4	161.4	51 58.5	161.1	52 57.4	160.9	0 50
40	49 22.0	165.5	50 21.5	165.3	51 21.0	165.1	52 20.4	164.8	53 19.7	164.6	40
30	49 38.6	169.1	50 38.2	168.9	51 37.9	168.8	52 37.6	168.6	53 37.3	168.4	30
20	49 50.4	172.7	50 50.2	172.6	51 50.1	172.5	52 50.0	172.4	53 49.9	172.3	20
10	49 57.6	176.3	50 57.6	176.3	51 57.6	176.2	52 57.5	176.2	53 57 5	176.1	10
0 00	50 0.0	180.0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

7° 06.9

Hour Angle.	0°		1°		2°		3°		4°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
6 00	0 00.0	90.0									6 00
5 50	1 15.0	92.1	0 22.9	92.7							5 50
40	2 29.9	94.3	1 37.9	94.8	0 45.8	95.3					40
30	3 44.5	96.5	2 52.4	97.0	2 00.2	97.5	1 08.2	98.0	0 16.2	98.5	30
20	4 58.9	98.7	4 06.7	99.2	3 14.5	99.7	2 22.3	100.2	1 30.1	100.7	20
10	6 12.8	100.9	5 20.4	101.4	4 28.2	101.9	3 35.9	102.4	2 43.5	102.8	10
5 00	7 26.1	103.1	6 33.7	103.6	5 41.3	104.1	4 48.8	104.5	3 56.3	105.0	5 00
4 50	8 38.9	105.3	7 46.2	105.8	6 53.7	106.3	6 01.1	106.7	5 08.4	107.2	4 50
40	9 50.9	107.5	8 58.1	108.0	8 05.2	108.5	7 12.4	108.9	6 19.6	109.4	40
30	11 01.9	109.7	10 08.8	110.2	9 15.9	110.7	8 22.9	111.1	7 29.8	111.6	30
20	12 12.0	112.0	11 18.8	112.5	10 25.5	113.0	9 32.3	113.4	8 39.0	113.9	20
10	13 20.9	114.3	12 27.4	114.7	11 34.1	115.2	10 40.5	115.6	9 46.9	116.1	10
4 00	14 28.6	116.6	13 34.9	117.0	12 41.2	117.5	11 47.4	117.9	10 53.6	118.4	4 00
3 50	15 35.0	118.9	14 41.0	119.3	13 47.1	119.8	12 53.0	120.2	11 58.9	120.7	3 50
40	16 39.9	121.2	15 45.7	121.7	14 51.4	122.1	13 57.0	122.5	13 02.6	123.0	40
30	17 43.2	123.6	16 48.7	124.1	15 54.1	124.5	14 59.4	124.9	14 04.7	125.3	30
20	18 44.9	126.0	17 50.0	126.4	16 55.0	126.9	16 00.0	127.3	15 04.9	127.7	20
10	19 44.6	128.4	18 49.2	128.8	17 54.1	129.3	16 58.8	129.7	16 03.4	130.1	10
3 00	20 42.2	130.9	19 46.7	131.3	18 51.1	131.7	17 55.4	132.1	16 59.6	132.5	3 00
2 50	21 37.9	133.4	20 41.9	133.8	19 46.0	134.2	18 50.0	134.5	17 53.9	134.9	2 50
40	22 31.3	135.9	21 35.0	136.3	20 38.6	136.7	19 42.3	137.0	18 46.0	137.4	40
30	23 22.2	138.4	22 25.6	138.8	21 28.9	139.2	20 32.2	139.5	19 35.4	139.9	30
20	24 10.7	141.0	23 13.7	141.4	22 16.7	141.7	21 19.6	142.0	20 22.5	142.4	20
10	24 56.5	143.6	23 59.2	144.0	23 01.8	144.3	22 04.4	144.6	21 07.1	144.9	10
2 00	25 39.5	146.3	24 41.9	146.6	23 44.2	146.9	22 46.5	147.2	21 48.7	147.5	2 00
1 50	26 19.6	149.0	25 21.7	149.3	24 23.7	149.5	23 25.6	149.8	22 27.5	150.1	1 50
40	26 56.8	151.7	25 58.5	152.0	25 00.1	152.2	24 01.8	152.5	23 03.4	152.7	40
30	27 30.7	154.4	26 32.1	154.7	25 33.6	154.9	24 34.9	155.2	23 36.2	155.4	30
20	28 01.5	157.2	27 02.6	157.4	26 03.7	157.6	25 04.8	157.9	24 05.9	158.1	20
10	28 28.8	160.0	27 29.7	160.2	26 30.6	160.3	25 31.5	160.6	24 32.3	160.8	10
1 00	28 52.7	162.8	27 53.4	163.0	26 54.0	163.1	25 54.7	163.3	24 55.3	163.5	1 00
0 50	29 13.1	165.6	28 13.5	165.8	27 14.1	165.9	26 14.5	166.1	25 15.0	166.2	0 50
40	29 29.9	168.5	28 30.2	168.6	27 30.5	168.7	26 30.8	168.8	25 31.0	168.9	40
30	29 43.0	171.3	28 43.2	171.4	27 43.4	171.5	26 43.6	171.6	25 43.8	171.7	30
20	29 52.5	174.2	28 52.5	174.3	27 52.5	174.4	26 52.6	174.4	25 52.7	174.5	20
10	29 58.1	177.1	28 58.1	177.1	27 58.2	177.2	26 58.2	177.2	25 58.2	177.2	10
0 00	30 0.0	180.0	29 0.0	180.0	28 0.0	180.0	27 0.0	180.0	26 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	5°		6°		7°		8°		9°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
5 20	0 38.0	101.1									5 20
10	1 51.2	103.3	0 58.9	103.8	0 06.4	104.3					10
5 00	3 03.8	105.5	2 11.3	106.0	1 18.8	106.5	0 26.2	107.0			5 00
4 50	4 15.8	107.7	3 22.9	108.2	2 30.2	108.6	1 37.4	109.1	0 44.8	109.6	4 50
40	5 26.7	109.9	4 33.8	110.4	3 40.9	110.8	2 47.9	111.3	1 55.0	111.8	40
30	6 36.7	112.1	5 43.6	112.6	4 50.5	113.0	3 57.2	113.5	3 04.0	114.0	30
20	7 45.7	114.3	6 52.3	114.8	5 58.9	115.2	5 05.4	115.7	4 12.0	116.2	20
10	8 53.3	116.5	7 59.7	117.0	7 06.1	117.4	6 12.4	117.9	5 18.7	118.4	10
4 00	9 59.8	118.8	9 05.9	119.3	8 11.9	119.7	7 17.9	120.2	6 23.9	120.6	4 00
3 50	11 04.8	121.1	10 10.5	121.6	9 16.3	122.0	8 22.0	122.4	7 27.7	122.8	3 50
40	12 08.2	123.4	11 13.7	123.9	10 19.1	124.3	9 24.5	124.7	8 30.0	125.1	40
30	13 09.8	125.7	12 15.1	126.2	11 20.2	126.6	10 25.2	127.0	9 30.3	127.4	30
20	14 09.8	128.1	13 14.7	128.5	12 19.5	128.9	11 24.2	129.3	10 29.0	129.7	20
10	15 07.9	130.5	14 12.4	130.8	13 16.9	131.2	12 21.3	131.6	11 25.8	132.0	10
3 00	16 03.9	132.9	15 08.1	133.2	14 12.3	133.6	13 16.4	134.0	12 20.5	134.4	3 00
2 50	16 57.8	135.3	16 01.7	135.6	15 05.5	136.0	14 09.2	136.4	13 12.9	136.7	2 50
40	17 49.5	137.7	16 53.0	138.1	15 56.4	138.4	14 59.8	138.8	14 03.2	139.1	40
30	18 38.6	140.2	17 41.8	140.5	16 44.9	140.8	15 48.0	141.2	14 51.1	141.5	30
20	19 25.4	142.7	18 28.3	143.0	17 31.0	143.3	16 33.7	143.6	15 36.5	144.0	20
10	20 09.5	145.2	19 12.0	145.5	18 14.4	145.8	17 16.9	146.1	16 19.2	146.4	10
2 00	20 50.9	147.8	19 53.1	148.1	18 55.2	148.4	17 57.3	148.6	16 59.4	148.9	2 00
1 50	21 29.4	150.4	20 31.3	150.6	19 33.1	150.9	18 34.9	151.1	17 36.7	151.4	1 50
40	22 05.0	153.0	21 06.6	153.2	20 08.2	153.5	19 09.7	153.7	18 11.2	153.9	40
30	22 37.4	155.6	21 38.8	155.8	20 40.1	156.1	19 41.4	156.3	18 42.5	156.5	30
20	23 07.0	158.3	22 08.0	158.4	21 09.0	158.7	20 09.9	158.9	19 11.0	159.0	20
10	23 33.1	160.9	22 33.8	161.1	21 34.8	161.3	20 35.4	161.5	19 36.2	161.6	10
1 00	23 55.9	163.6	22 56.5	163.8	21 57.1	163.9	20 57.7	164.1	19 58.3	164.2	1 00
0 50	24 15.3	166.3	23 15.8	166.5	22 16.2	166.6	21 16.6	166.7	20 17.0	166.8	0 50
40	24 31.4	169.0	23 31.7	169.1	22 32.0	169.2	21 32.2	169.4	20 32.5	169.5	40
30	24 43.9	171.7	23 44.0	171.8	22 44.2	171.9	21 44.3	172.0	20 44.4	172.1	30
20	24 52.8	174.5	23 52.8	174.6	22 52.9	174.6	21 53.0	174.7	20 53.1	174.7	20
10	24 58.2	177.2	23 58.2	177.3	22 58.2	177.3	21 58.2	177.3	20 58.2	177.3	10
0 00	25 0.0	180.0	24 0.0	180.0	23 0.0	180.0	22 0.0	180.0	21 0.0	180.0	0 00

In **North** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In **South** declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	10°		11°		12°		13°		14°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 40	1 02.0	112.2	0 09.0	112.7							4 40
30	2 10.9	114.4	1 17.6	114.9	0 24.4	115.4					30
20	3 18.6	116.6	2 25.2	117.1	1 31.7	117.5	0 38.2	118.0			20
10	4 24.9	118.8	3 31.2	119.3	2 37.4	119.7	1 43.7	120.2	0 49.8	120.6	10
4 00	5 29.9	121.0	4 36.0	121.5	3 42.0	121.9	2 47.9	122.4	1 53.7	122.8	4 00
3 50	6 33.4	123.2	5 39.0	123.7	4 44.7	124.1	3 50.4	124.6	2 55.9	125.0	3 50
40	7 35.3	125.5	6 40.7	126.0	5 46.0	126.4	4 51.3	126.8	3 56.6	127.2	40
30	8 35.4	127.8	7 40.4	128.2	6 45.5	128.6	5 50.5	129.0	4 55.4	129.4	30
20	9 33.8	130.1	8 38.5	130.5	7 43.2	130.9	6 47.9	131.3	5 52.5	131.7	20
10	10 30.2	132.4	9 34.5	132.8	8 38.9	133.2	7 43.2	133.5	6 47.5	133.9	10
3 00	11 24.5	134.7	10 28.6	135.1	9 32.6	135.5	8 36.6	135.8	7 40.5	136.2	3 00
2 50	12 16.7	137.1	11 20.3	137.4	10 24.1	137.8	9 27.8	138.1	8 31.3	138.5	2 50
40	13 06.6	139.5	12 10.0	139.8	11 13.3	140.1	10 16.6	140.5	9 19.9	140.8	40
30	13 54.1	141.9	12 57.1	142.2	12 00.2	142.5	11 03.1	142.8	10 06.1	143.1	30
20	14 39.3	144.3	13 42.0	144.6	12 44.6	144.9	11 47.3	145.2	10 49.9	145.5	20
10	15 21.7	146.7	14 24.1	147.0	13 26.4	147.3	12 28.8	147.6	11 31.0	147.9	10
2 00	16 01.5	149.2	15 03.6	149.5	14 05.6	149.7	13 07.6	150.0	12 09.7	150.3	2 00
1 50	16 38.5	151.7	15 40.2	151.9	14 42.0	152.1	13 43.7	152.4	12 45.4	152.7	1 50
40	17 12.6	154.2	16 14.1	154.4	15 15.6	154.6	14 17.1	154.9	13 18.5	155.1	40
30	17 43.8	156.7	16 45.0	156.9	15 46.2	157.1	14 47.4	157.3	13 48.7	157.5	30
20	18 12.0	159.2	17 13.0	159.4	16 14.0	159.6	15 15.0	159.8	14 15.9	160.0	20
10	18 37.0	161.8	17 37.7	162.0	16 38.5	162.1	15 39.2	162.3	14 39.9	162.4	10
1 00	18 58.8	164.4	17 59.4	164.5	17 00.0	164.7	16 00.5	164.8	15 01.0	164.9	1 00
0 50	19 17.4	166.9	18 17.8	167.0	17 18.2	167.2	16 18.6	167.3	15 18.9	167.4	0 50
40	19 32.7	169.5	18 33.0	169.6	17 33.2	169.7	16 33.5	169.8	15 33.7	169.9	40
30	19 44.6	172.1	18 44.7	172.2	17 44.9	172.3	16 45.1	172.4	15 45.1	172.4	30
20	19 53.1	174.8	18 53.2	174.8	17 53.3	174.9	16 53.4	174.9	15 53.4	175.0	20
10	19 58.3	177.4	18 58.3	177.4	17 58.3	177.4	16 58.4	177.4	15 58.4	177.5	10
0 00	20 0.0	180.0	19 0.0	180.0	18 0.0	180.0	17 0.0	180.0	16 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	15°		16°		17°		18°		19°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
4 00	0 59.6	123.2	0 05.5	123.6							4 00
3 50	2 01.6	125.4	1 07.1	125.8	0 12.8	126.2					3 50
40	3 01.9	127.6	2 07.1	128.0	1 12.4	128.4	0 17.7	128.8			40
30	4 00.4	129.8	3 05.3	130.2	2 10.3	130.6	1 15.2	131.0	0 20.1	131.4	30
20	4 57.1	132.0	4 01.6	132.4	3 06.3	132.8	2 10.9	133.2	1 15.4	133.6	20
10	5 51.8	134.2	4 56.0	134.6	4 00.3	135.0	3 04.5	135.4	2 08.7	135.8	10
3 00	6 44.4	136.5	5 48.2	136.9	4 52.2	137.3	3 56.1	137.6	3 00.0	138.0	3 00
2 50	7 35.1	138.8	6 38.4	139.2	5 42.1	139.5	4 45.7	139.8	3 49.1	140.2	2 50
40	8 23.1	141.1	7 26.3	141.5	6 29.6	141.8	5 32.8	142.1	4 36.0	142.4	40
30	9 09.0	143.4	8 11.9	143.8	7 14.9	144.1	6 17.8	144.4	5 20.5	144.7	30
20	9 52.5	145.8	8 55.0	146.1	7 57.6	146.4	7 00.2	146.7	6 02.7	147.0	20
10	10 33.3	148.1	9 35.7	148.4	8 37.9	148.7	7 40.1	149.0	6 42.3	149.2	10
2 00	11 11.6	150.5	10 13.5	150.8	9 15.5	151.0	8 17.4	151.3	7 19.3	151.5	2 00
1 50	11 47.1	152.9	10 48.8	153.1	9 50.5	153.3	8 52.2	153.6	7 53.7	153.8	1 50
40	12 19.9	155.3	11 21.3	155.5	10 22.7	155.7	9 24.0	156.0	8 25.4	156.2	40
30	12 49.8	157.7	11 51.0	157.9	10 52.1	158.1	9 53.2	158.3	8 54.4	158.5	30
20	13 16.8	160.2	12 17.6	160.3	11 18.6	160.5	10 19.5	160.7	9 20.4	160.9	20
10	13 40.7	162.6	12 41.4	162.7	11 42.1	162.9	10 42.9	163.1	9 43.5	163.3	10
1 00	14 01.6	165.1	13 02.1	165.2	12 02.6	165.3	11 03.1	165.5	10 03.7	165.6	1 00
0 50	14 19.4	167.5	13 19.7	167.6	12 20.1	167.7	11 20.4	167.9	10 20.8	168.0	0 50
40	14 33.9	170.0	13 34.1	170.1	12 34.4	170.2	11 34.6	170.3	10 34.9	170.4	40
30	14 45.2	172.5	13 45.4	172.6	12 45.7	172.6	11 45.8	172.7	10 45.8	172.8	30
20	14 53.4	175.0	13 53.4	175.1	12 53.5	175.1	11 53.6	175.1	10 53.6	175.2	20
10	14 58.4	177.5	13 58.4	177.5	12 58.4	177.5	11 58.4	177.5	10 58.4	177.6	10
0 00	15 0.0	180.0	14 0.0	180.0	13 0.0	180.0	12 0.0	180.0	11 0.0	180.0	0 00

In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from South to West.

Hour Angle.	20°		21°		22°		23°		24°		Hour Angle.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
h. m.	° ′	°	° ′	°	° ′	°	° ′	°	° ′	°	h. m.
3 20	0 20.0	134.0									3 20
10	1 12.9	136.1	0 17.2	136.5							10
3 00	2 04.0	138.3	1 07.8	138.7	0 11.7	139.0					3 00
2 50	2 52.7	140.5	1 56.3	140.9	0 59.7	141.2	0 03.3	141.6			2 50
40	3 39.2	142.8	2 42.4	143.1	1 45.6	143.4	0 48.8	143.7			40
30	4 23.3	145.0	3 26.3	145.3	2 29.2	145.6	1 31.9	145.9	0 34.8	146.2	30
20	5 05.3	147.2	4 07.8	147.5	3 10.3	147.8	2 12.8	148.1	1 15.3	148.4	20
10	5 44.6	149.5	4 46.8	149.8	3 49.1	150.0	2 51.2	150.3	1 53.4	150.6	10
2 00	6 21.3	151.8	5 23.2	152.1	4 25.2	152.3	3 27.1	152.6	2 29.0	152.8	2 00
1 50	6 55.5	154.1	5 57.1	154.3	4 58.7	154.5	4 00.4	154.8	3 02.0	155.0	1 50
40	7 26.9	156.4	6 28.2	156.6	5 29.6	156.8	4 31.0	157.0	3 32.3	157.2	40
30	7 55.4	158.7	6 56.6	158.9	5 57.8	159.1	4 58.8	159.3	3 59.9	159.4	30
20	8 21.3	161.0	7 22.2	161.2	6 23.1	161.4	5 24.0	161.6	4 24.9	161.7	20
10	8 44.2	163.4	7 44.9	163.6	6 45.6	163.7	5 46.3	163.8	4 46.9	164.0	10
1 00	9 04.2	165.7	8 04.6	165.9	7 05.0	166.0	6 05.5	166.1	5 06.1	166.3	1 00
0 50	9 21.2	168.1	8 21.6	168.2	7 21.9	168.3	6 22.2	168.4	5 22.5	168.6	0 50
40	9 35.1	170.5	8 35.3	170.6	7 35.6	170.7	6 35.8	170.7	5 36.0	170.8	40
30	9 45.9	172.8	8 46.1	172.9	7 46.2	173.0	6 46.3	173.0	5 46.5	173.1	30
20	9 53.7	175.2	8 53.8	175.3	7 53.9	175.3	6 53.9	175.3	5 54.0	175.4	20
10	9 58.4	177.6	8 58.5	177.6	7 58.5	177.6	6 58.4	177.7	5 58.4	177.7	10
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In North declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from North to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

In South declination, when the star is rising or East of the meridian, the tabulated azimuths are reckoned from South to East; and when the star is setting or West of the meridian, the tabulated azimuths are reckoned from North to West.

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